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EDITORIAL NOTES.

As the annual meeting of the American Medical Association convenes the day this number of the JOURNAL goes to press, it is not THE A. M. A. possible to publish any matter MEETING. relative to the meeting in this issue. At the time of writing, however, there is every prospect that the meeting will be largely attended and that the California members will be there in considerable numbers. The program, as outlined in the Journal A. M. A., is an exceedingly good one and should provoke much enlightening discussion. To the Committee of Arrangements is due much praise and our sincere thanks for the way in which the details that make so much for the comfort and convenience of those attending a convention of any sort, have been looked after and thoughtfully studied out. It is no small job to arrange for the smooth running of a convention of this magnitude and the comfort of those in attendance. Our thanks and our congratulations to our colleagues of Los Angeles.

Collections of medical men in societies will discuss in heated argument, and pass resolutions against, abuses—which they then proceed to LACK OF forget most promptly; or to ignore SUPPORT. as though forgotten. At the meeting of the American Medical Association in Portland, 1905, some resolutions were intro-

duced into the House of Delegates by the representative from Michigan, which State Medical Society had previously adopted these resolutions. They denounced the proprietary medicine frauds and called upon the Association to "do something" to stop the then existing condition of things. It was at this same time that the Council on Pharmacy and Chemistry of the American Medical Association had its beginning. One would naturally suppose that, having considered the matter, passed resolutions about it and then officially called upon the American Medical Association to "do something" to clean up the proprietary mess, Michigan would be one of the very strongest states in its support of the Council on Pharmacy and Chemistry and of the campaign for decency in medical journal advertising. But alas for our hopes! Michigan is willing to pass resolutions; that costs nothing. But Michigan does not seem willing to exclude or to do without advertising matter of an objectionable sort. The last number of the *Journal* published by the Michigan State Medical Society (June) contains the advertisements of the following choice specimens: bovine; glycothymoline; sulfothen, thyosal (with some wonderful properties!); Fellows' hypophosphites; ergoapiol; salhepatica; and our old friend, "Daniel's passiflora." The dignified and ancient-of-years Medical Society of New Jersey, permits the advertisement of glycothymoline in its official publication, as does the Kansas Medical Society—and Kansas also allows its *Journal* to print the advertisements of antiphlogistine and kathermon. South Carolina permits its official publication to advertise these nostrums: Gray's glycerine tonic; glycothymoline; antiphlogistine and gastron. Minnesota goes still further in its aid to the nostrum maker and advertises apioline; glycothymoline; ergoapiol; antiphlogistine; echitone; peptomangan; salhepatica and colchisal. Oklahoma varies the monotony by advertising neurosine; Tyree's powder, and germiletum. Ohio has ergoapiol; glycothymoline; Grey's tonic; Fellows' hypophosphites and peptomangan. Needless to say, none of these preparations has been approved by the Council on Pharmacy and Chemistry of the A. M. A.

Why do these state medical societies support the Association's work in fighting nostrums and fraudulent proprietary preparations? WHAT IS THE REASON? through the Council, and at the same time fail to support that work at home by accepting such nostrum advertisements for their respective official publications? It is indeed a question. It seems such an absurdly anomalous position, especially for a learned society. It has come to be a recognized and a fixed proposition that the advertising medium is, in large degree, responsible to its subscribers for the character of the advertising which it presents to them in its advertising pages. No publication of

any standing would think of denying that responsibility; many of them, like *Collier's* and the *Ladies' Home Journal*, take pride in it and brag about it. Are the publications of these state medical societies any less reputable than private publishers? Should they be any less honest in looking after the interests of their subscribers? It is not possible to answer these questions in the affirmative. Then why do they publish such advertisements? It cannot be through ignorance, for a letter addressed to the Council would at once dispel the ignorance. Can it possibly be that societies of this character are willing to sell out for the dirty dollars of the nostrum maker? Perish the thought! It must be ignorance.

A number of physicians have complained of the activities of the Board of Pharmacy in administering what is known as "section

WARNING TO PHYSICIANS. eight of the poison law." This portion of the law regulating the sale of poisons is a very important one to physicians. It specifically says that

"It shall be unlawful for any practitioner of medicine, dentistry or veterinary medicine to furnish to or to prescribe for the use of any habitual user of the same, any cocaine, opium, morphin, codein, heroin or choral hydrate . . . provided, however, that the provisions of this section shall not be construed to prevent any duly licensed physician from furnishing or prescribing in good faith for the habitual user of any narcotic drugs who is under his professional care, such substances as he may deem necessary for their treatment, when such prescriptions are not given or substances furnished for the purpose of evading the purposes of this act."

The section seems to be unusually clear in its wording and plain in its meaning. A physician may prescribe for a drug habitue who is his patient, in good faith, a sufficient quantity of his drug. The prescription must be written in good faith; it must be for one who is the actual patient of the physician. It does not mean that any doctor may write one or more prescriptions for morphin for anyone who comes into his office and makes a strong plea for it. It does not mean that a doctor may sign a hundred or more prescriptions in blank and leave them at some drug store so that the pharmacist may sell the stuff under the protection of a "prescription"—and then divide with the dishonest doctor. Shocking as it may seem, this has actually been done by a licensed physician in this state, and a member of his county medical society. Some men seem to think that their rights or privileges have been invaded by this poison law; they have not; any physician has as much right to prescribe or give morphin, cocaine, chloral, etc., honestly and legitimately as he ever had. It is claimed that detectives from the Board of Pharmacy have come into doctors' offices, told heartrending tales, and been given prescriptions which were afterward used in evidence against the doctor. This may or may not be true, but it certainly is true that in nearly, if not quite every case

where a physician has been arrested under this law, he has plead guilty and paid his fine. The Secretary of the Board of Pharmacy advises us that they never make an arrest on a single violation of the law; it is only when one of their inspectors has obtained several prescriptions for one or other of the proscribed drugs, that arrests are made. It is also true that a good many physicians are far too careless in believing what they are told and in giving prescriptions for narcotic drugs. Then there is another class that is composed of dishonest physicians; they sell prescriptions of this sort for a price; sometimes they sell the drug itself—one licensed physician in the South made a living solely by selling morphin and cocaine to habitues. Truly, a nice occupation. Remember the poison law and do not be inveigled into violating it by the hard-luck story of some one who is not your patient.

To say that cheap work is poor work is but another way of phrasing the Biblical statement that "the laborer is worthy of his hire." If he is not, then is he

CHEAP WORK

POOR WORK. a mighty poor laborer and unworthy of any hire.

In this world (whatever may be the case in others) one gets just about what he pays for; "something-for-nothing" is a beautiful dream. All of which is apropos of a card announcing, on one side, the location of the "Pacific Wassermann Laboratories," and on the other giving a scale of prices for various forms of laboratory work. This "laboratory" is, we are advised, operated by an ex-hospital steward and another whose term of enlistment has not expired. The prices quoted are absurd; they would make a competent man blush. "Wassermann test, \$5.00. Widal, \$1.00. Urine, chemical and microscopic, \$1.50. Feces, for typhoid bacillus, \$3.00. 606 prepared, \$2.00." And so on down the list. It is obvious that if some physicians did not patronize these cheap people, they could not pay office rent and have cards printed. And yet it is difficult to imagine what sort of physician would place any dependence upon the reports from men who are probably trained only in the routine work of preparing material for examination but, without medical education or experience, could not possibly be competent to give an opinion of any real value on their findings. One can but pity the case of the patient who places himself in the hands of a physician who will, in turn, place his own reputation and possibly the future of his patient, in the hands of such cut-rate gentry. Cheap work is poor work.

In spite of all that has been said or can be said in favor of a sane Fourth of July celebration, there

TETANUS will be, if not always, at least for a long time to come, a certain **ANTITOXIN.** number of idiots who will shoot or wound themselves or others in their desire to make a noise on that day. It is a well recognized fact that tetanus is quite apt to occur after gun-shot or toy-pistol wounds, and it is also recognized that the prophylactic use of tetanus antitoxin is greatly reducing the death rate

from this disease. All manufacturers of this anti-toxin are now making reliable preparations and are getting them out in time for use in the treatment of injuries attendant upon the crazy Fourth. In every case of gunshot or similar wound, the antitoxin should be used immediately as a prophylactic measure; it is pretty cheap insurance against a most unpleasant infection—tetanus.

On another page will be found the list of the Lane Lectures for 1911, together with the subjects of each discourse and the date and **THE LANE** hour. As suggested in a previous **LECTURES.** issue of the **JOURNAL**, these lectures should be of special interest, not alone to the physician who is particularly interested in eye diseases, but also to the general practitioner and to the diagnostician. The treatment of the subject is such as to bring out forcibly the relation of the eye to the rest of the human economy in disease. There will be two lectures a day, one at 11 in the morning and the other at 4:30 in the afternoon, the first on August 21st and each day thereafter to and including the 25th.

If the *Journal* of the American Medical Association had done nothing more than to collect and compile the returns of accidents **THE FOURTH** and deaths as a result of the **OF—DEATH.** idiotic celebration of the 4th of July, it would have enough ex-

use for the high position which it holds. Year after year children were injured, burned, maimed or killed as a result of accidents from firearms, etc., and while everybody knew that this was so, more or less, nobody paid any particular attention to it. Until the returns for the whole country were gathered together by the *Journal*, the ghastliness of the needless slaughter was not forced upon one. For some years past, the *Journal* has, each year, presented the net cost in life and health of the old-time noisy fire-cracker, toy-pistol celebration of the 4th of July, in a way to attract the attention of anyone who thinks; and a good many people have thought about it. The "sane fourth" idea is gaining in popular esteem and more and more communities are excluding the deadly toy-pistol and similar devices for making a senseless noise—and doing a great deal of harm. The credit for this progressive popular move should be given where it is rightly due—to the *Journal* of the American Medical Association.

Is the manner in which we handle those who are mentally deranged, sane or insane? It certainly is not human! For years Dr. **SANE OR** Hoisholt and others have pointed out, **INSANE?** in papers read before various county societies and before the State Society, the inhuman and almost criminal manner in which insane patients are treated under the laws of California. It may be said that the condition in California is no worse than in almost every other state. From time to time the State Society has passed resolutions on the matter. The Texas State Medical

Association, at its last meeting, passed resolutions on the same subject and it is evident that equally brutal conditions prevail in that state. But what can we do about it? It is a matter of politics. At the present time sheriffs and deputy sheriffs are charged with the care of insane persons and the bringing of them to the state institution. They get fees and mileage for this work—and every little bit helps. One way of spelling the kind of politics that we ordinarily get is "votes." All of these gentlemen are in politics; each one of them commands a certain number of votes or a certain influence in his district. He does not want the present system changed, for then he would lose his fees and his mileage. The state hospital nurse, who should be sent to take charge of the patient and bring him quietly and properly to the institution, is not in politics; has no command of votes or influence; cannot have much persuasion upon the legislator. And with the legislator it is mostly votes that count, not abstract principles of right or wrong. Passing resolutions in California or in Texas is a harmless pastime that disturbs no one; and also, it has no effect; votes count. What can one possibly expect of a legislature that will actually pass a bill rewarding any one who has successfully broken the laws of the state for fifteen years? What humanitarian advancement can one expect at the hands of a legislature that will go back into the middle ages and attempt to do away with vaccination? Legislating is a gentle and joyous pastime—but votes count, not resolutions or principles.

With the increasing use of salvarsan, we now find scattered through the literature many reports of cases where various sorts of disturbances and even deaths have followed its injection.

SALVARSAN, NEW INDICATIONS. These reports might lead to an exaggerated fear of this, our most effective anti-syphilitic drug, were they not subjected to most careful analysis and study. In a recent issue of the *Journal A. M. A.*, Schamberg has investigated the cause of inflammation of cranial nerves following its use. He finds that on the whole, these neuritic (most commonly optic and auditory) complications are not frequent, possibly no more so that after the employment of mercury. They have been encountered almost exclusively in cases of recent lues, and have yielded to either a second injection or to mercury and iodid. None have been reported after the intravenous administration of the drug. In advanced degenerative processes of the central nervous system, and in marked cachexias, salvarsan is apt to produce death; in fact, this is so well known, and universally acknowledged, as to require no discussion. Such reports are common, and no doubt there are still more deaths which most authors will prefer not to put on record. In the *Munchener Medizinische Wochenschrift* of May 16th Martius reviews, at the request of Ehrlich, the deaths after salvarsan in cases of cardiac and vascular disease. Of all known fatalities, but 7 can be attributed to the action of the drug upon the heart. In 5 of these, post mortems revealed the presence of the triad:

luetic aortitis, coronary sclerosis and myocarditis, so that the first, complicated by any form of cardiac disease absolutely contraindicates the employment of 606. In 4 of the 7 fatal cases there were no clinical evidences of cardio-vascular changes; in 3 of these 4 cases subjective troubles likewise were absent. Angina pectoris, without myocardial complications, is apparently favorably influenced by salvarsan. This last opinion is contrary to Ehrlich's earlier view. In Ehrlich's early publications, salvarsan was said to be contraindicated in nephritis, albumin, hyalin and granular casts and red blood cells having been found occasionally after its use, in previously normal urines. Nephritis occurring soon after syphilitic infection or during the course of the disease, was formerly often attributed to the mercury the patient had taken. But it has been definitely shown that a large number of these cases are due to toxins of syphilis acting upon the renal tissues and that lues can produce almost all anatomical types of acute or chronic nephritis. Furthermore, a number of these cases improve under mercurial treatment (in marked contrast to non-luetic nephritides which are always aggravated by it), but on the other hand, some are uninfluenced and a few are unfavorably affected thereby. To date, in none of the cases have treponema pallida been found in the urine. During the past months, salvarsan has been tried in cases of luetic nephritis. Lesser, Michaelis, Gaucher, Duhot, Nador, Widal and Javal have had very encouraging results. Caussade and Regnard report a severe case where the patient's death occurred "in spite of" and not "due to" its administration. While it cannot be claimed, once and for all, that this new drug is absolutely harmless in patients with diseased kidneys, or uniformly efficacious in renal syphilis, it should certainly be employed more extensively in these cases than in the past. A careful anamnesis should be taken, and a thorough physical examination performed before deciding in any given case to resort to the use of 606. Thus only can disaster be averted, and knowledge be obtained as to the real effects of this drug upon the human organism. The intravenous administration is the only method to be recommended. Solutions should be prepared at the time of injection and be "just alkaline," hyperalkaline ones exerting a pernicious action upon the vein and the blood. (J. Darier et Cotteton.)

R. B.

Recent reports of new diagnostic signs in scarlet fever again prove that progress in diagnosis can still

DIAGNOSIS OF SCARLET FEVER. be expected from clinical as well as from laboratory ob-

servations and research. At the height of the disease typical cases offer no difficulties, but with fleeting symptoms, or with eruptions that have already run their course, or with eruptions due perhaps to other causes, most difficult problems are presented the attendant. Even in severe cases the desquamation may be slight or not more than that usually seen in patients who have been for some time confined to the bed. In our June issue, Taubles reports having verified the observations of Pastia of Bucharest in 18 cases of scarlet fever. Pastia's sign consists of an

intense, continuous, linear pigmentation of the skin-folds across the anterior surface of the elbow, varying in color from rose red to dregs of wine and even appearing ecchymotic. This sign appears with the onset of the rash and persists even later than the desquamation. Leede of Hamburg has described another sign. A broad rubber bandage is moderately tightened about the arm, so that the veins are made prominent and the hands blue, but allowing the pulse to remain palpable. At the end of 10 to 15 minutes it is removed and the skin at the bend of the elbow closely inspected for the presence of a few tiny ecchymotic spots. He concludes that the capillary resistance varies in different persons, but that the toxins of scarlet fever evidently, with few exceptions, lower this resistance. A negative reaction practically excludes the disease; a positive one is, of course, to be interpreted only in conjunction with the other symptoms, as has been emphasized by Bennecke. Furthermore, Frugoni and Giugni have described a somewhat similar test in cases showing cutaneous manifestations of a hemorrhagic diathesis. Scarlet fever heretofore could boast of no pathognomonic sign or symptom. We would like to urge all observers to search carefully for these new signs, not only in scarlet fever cases but in all eruptive conditions, so that their value may soon be established beyond all doubt.

R. B.

THE CALIFORNIA ASSOCIATION OF MEDICAL MILK COMMISSIONS.

For two years there has been held in connection with the meeting of the State Society and at the invitation and expense of the San Francisco commission, a meeting devoted to the consideration of a pure milk supply. These meetings were so profitable and interesting, and the certified milk industry has now reached so high a development in California, that it has seemed wise to make these meetings an annual adjunct of the State meeting, and to federate the various commissions into a permanent state organization. Accordingly, there was formed at Santa Barbara the California Association of Medical Milk Commissions. The association is composed of the milk commissions of the County Medical Societies, and its purpose is to promote the use of certified milk and to assist in raising the general milk supply to a higher standard, by dispensing literature on this subject, by illustrated lectures, by public meetings, and by personal work among the profession, the laity, and the dairymen. Any County Medical Society interested in the formation of a milk commission may obtain literature, lantern slides, etc., from the association, and members will be delegated, on request, to visit societies which may desire assistance in this work, or to appear before clubs or other public bodies. It is believed that this work is of great importance, and it is hoped to awaken a wider interest in this subject among the profession and, through the physicians, among their patients. Dr. Adelaide Brown is secretary of the association, and will be glad to give any information to persons interested in this work.

T. C. McC.

ORIGINAL ARTICLES

THE EXPERIMENTAL BASIS OF VACCINE THERAPY.*

By FREDERICK P. GAY, M. D., University of California, Berkeley.

It would be rash indeed to attempt to outline the potential value of vaccine therapy but one may sketch very clearly the historical path that has led to our present method of treating bacterial infections by injecting killed cultures of bacteria. When we later come to consider the rationale of this latest aspect of immunization, that is immunization employed as a therapeutic measure, we shall find ourselves stopping short of ultimate explanation embarrassed not at any failure of the laboratory worker to respond to clinical demand, but by the fact that practice has outstripped theory, and not it is to be feared to the ultimate benefit of practice itself.

The principle of artificial immunization as a measure of prophylaxis is as old as history and may still be found practiced empirically among savage tribes. As soon as a people begins to reason effectively from cause to effect they naturally attempt to create artificially the advantageous condition of acquired immunity which they see has resulted from recovery from a natural disease. The Moors protected their cattle from pleuropneumonia by inoculating them subcutaneously with diseased organs. The South African Vatus still practice a method of self-immunization against snake bite. The Chinese in early times found they were able to protect themselves from smallpox by inducing a mild form of the disease through placing scabs of variola in the nostrils. This protection by variolization was replaced in 1798 by Jenner's system of vaccination which made use of the novel but fundamental principle of producing immunity through a modified form of the disease.

It was this principle which with the advent of bacteriology, enabled Pasteur to utilize bacterial cultures of diminished virulence in protecting against fowl cholera and anthrax. The observations of Salmon and Smith with hog cholera proved that even killed cultures may be employed for the purpose.

Another and most significant advance in our knowledge of the possibilities of vaccination lay in the discovery of the method of preventing rabies. Owing to the long incubation period in the disease, Pasteur found that an active immunity might be induced by inoculations of rabies virus of increasing potency, if the treatment is inaugurated within fifteen to twenty days after the bite of a rabid animal. This treatment following inoculation makes the logical as well as historical step between vaccination for prophylaxis and vaccination in treatment.

The treatment of a disease in active progress by inoculation of the virus of the disease itself was first suggested by Koch in the tuberculin treatment for tuberculosis. Over-enthusiasm of many untrained observers as well as failure to appreciate the real principle involved led to a rapid discrediting of what represents a thoroughly logical though still imperfect method of treating this dread disease. The best observations to-day show that judiciously ad-

ministered treatment with tuberculin in conjunction with the usual hygienic measures distinctly increases the percentage of cures.

It remained for A. E. Wright, beginning in 1902, to emphasize and to enlarge the scope of active immunization as a method of treatment. Discouraged at the essential failures which were being met with in attempting to treat bacterial infections by passive immunization which had proved so effective in treating certain bacterial intoxications, Wright struck back to the trail which had been so successfully blazed by Pasteur. I shall not at this point criticize Wright's method of approach but may point out at once that his results were not only encouraging but in many points remain practically successful.

Wright's method of treating bacterial infections with killed cultures of the micro-organism concerned, is particularly and primarily efficient with localized lesions, both acute and chronic. The effect produced depends on provoking a generalized reaction of the body which re-enforces the purely local immunity in the tissue surrounding the lesion. The result is commensurate with an increase in antibodies that may be demonstrated in the blood of the patients themselves as well as the more firmly grounded data obtained from active immunization in experimental animals. The extension of this principle of vaccine therapy to the systemic bacterial infections like pneumonia and endocarditis is at once more doubtful practically and more difficult to explain. And at this point we may digress for a moment to criticize Wright's method of attack on this problem of which he has admittedly been the one to prove the importance.

The inauguration of the increasingly successful methods of protecting human beings by vaccination against cholera, plague and typhoid has depended directly on the animal experiments of Pasteur and of Pfeiffer. In the case of antityphoid prophylaxis we owe the best methods of standardizing the vaccine by means of its toxicity for guinea pigs, to Wright himself. And yet in the at best tentative development of vaccine therapy Wright practically omitted experiments on the lower animals and contented himself with experiments in human beings. I am not here concerned with this transition of method from the standpoint of morality so much as from the standpoint of scientific accuracy and expediency. It need scarcely be pointed out to you that animal experimentation offers the only possible method of acquiring the complete series of facts and any consequent deduction as to the cause of biological phenomena. As has just been mentioned the successful treatment of localized infections by vaccination can be explained in a general way *a posteriori* from previous animal experimentation. We know now, however, that Wright's misconception of opsonic activity has only recently been unraveled by careful experimentation in the hands of others who were less eager to offer diagnosis in a few individual cases than to attain to some knowledge of the general principle involved.

When we come then to ask ourselves what results we may expect from Wright's suggestion that we treat, let us say a case of acute endocarditis with inoculations of the micro-organism which is swarm-

* Read at the Forty-first Annual Meeting of the State Medical Society, Santa Barbara, April, 1911.

ing in the blood, we find very few facts on which to base a belief. We find ourselves relying solely on what we think has happened in a few apparently similar human cases that have been treated in what we believe to be the same manner. Each one of these cases has been considered apart from any possible control as to what would have happened if no treatment had been given, and each case represents a condition of which we have only the barest conception even under the best conditions in a well-organized hospital. It is true that if we keep our courage up until a hundred cases more or less have done better or worse under this treatment, and if we have made the most minute observations on this series of cases, we may hope to draw some conclusions by comparing them with a similar number of cases treated in other ways and equally well followed. And even then if we find the treatment justified by the results, how may we hope to know from any exact knowledge of the mechanism of the reaction that takes place, how we should modify the treatment to make it more efficient? The plea then is that in applying an experimental method to human beings we should make haste slowly and be patient enough to learn something of the general principle involved, through animal experimentation, before we start to treat individual cases.

In this particular case the experimenter can say little as to the justification for treating a septicemia with bacterial vaccines. It is not easy to see how we can hope to justify it on the ground of provoking any more general reaction as is the case in localized infections. It may, however, be suggested as Smith has done, that the bringing into play of new and unused areas of reaction such as are employed in subcutaneous inoculations might give a reasonable basis of justification in trying this method of treatment.

I think I have sufficiently indicated to you that Wright's method of developing vaccine therapy seems injudicious, although it must be confessed that his popular method has stirred up a general appreciation of the importance of the principle involved. Let us hope that the discrediting of his more visionary ideas on blood coagulation and the opsonic index will not serve to detract from interest in his main thesis of vaccine therapy. In view of these strictures on Wright's method it may seem inconsistent to suggest a possible further improvement of vaccine therapy in human beings. The suggestion, however, is based on results obtained by the methods that have been evolved in active immunization of animals. It has been found that the highest grade of antibacterial immunity is produced by immunizing animals with living rather than with killed bacteria. It has further been found that the best serum to combat an infection like that produced by the bacillus of dysentery is produced by immunizing horses not only against several strains of dysentery bacilli but against the endotoxins of the bacillus. It would be quite feasible to treat human beings with living instead of dead cultures of bacteria at least in the case of those organisms which do not tend to produce generalized infections. We have instances of such inoculation with living cultures in the original and successful method of preventing cholera inaugurated by

Ferran. The use of endotoxins as well as whole bacteria would present no danger over the present method. It seems then quite probable from animal experiments that a more efficient therapeutic reaction to bacterial infections might be induced in human beings by the use of living instead of dead bacteria and by the use of endotoxins in conjunction with the bacterial bodies.

I have often wondered what the present state of mind of the clinician may be in respect to the accepted status of immunity from disease. Facts have accumulated so rapidly that they can scarcely be set in order by one who devotes his entire attention to the subject. The balance of evidence has swung between the cells and the body fluids, first Mechnikoff with emphasis on Phagocytosis, then Pfeiffer, Bordet and Ehrlich with accentuation of the humoral aspects, and last the newer viewpoint of Wright lying half way between, and, in reality, linking the two schools together. It seems to me that Wright with his opsonic theory, was a better harmonizer than he knew. Those bodies known as opsonins, which he insisted on with pardonable pride as *sui generis*, seem now to differ very little from the known antibodies (sensitizers or amboceptors) which were really anticipated by Metchnikoff under the name of "stimulins." Facts seem to be tending to prove that the apparently dual lysins evidenced principally in the test tube, may in the body exert their action as a single body combining the attributes of amboceptor, sensitizing and opsonin, and affecting the bacterium in such a way as to make it more readily devoured by the phagocytes which under normal conditions retain the digestive ferment (cystase, alexin, or complement) that is liberated into the serum under artificial condition. Phagocytosis, then, would be the ultimate and essential process, its completeness depending on the degree of sensitization or opsonization produced extracellularly by the antibodies which are the specific results of immunization. This simplified scheme is I believe consistent with the trend of investigations in immunity.

It would seem, in review, that I have been able to offer little help, except perhaps in the line of simplification and clarification, towards the experimental basis of vaccine therapy. The fault lies as I have said in that the experimental basis of vaccine therapy has been inadequate for a safe prognosis. There remains, however, I hope, no doubt in your minds as to the eventual soundness of the method. I have simply ventured to plead for more scientific conservatism in learning its mechanism as tending toward a greater usefulness.

A CLINICAL VIEW OF VACCINE THERAPY.

By HERBERT C. MOFFITT, M. D., San Francisco.

In yielding hesitatingly to the request of the program committee to present in the few minutes at our disposal, the clinical side of the vaccine question my decision was determined by the fact, apparent from observation of the cases of many different men, that lax methods in the application and overenthusiasm in the use of vaccines would tend

* Read at the Forty-first Annual Meeting of the State Medical Society, Santa Barbara, April, 1911.

naturally to their discredit. Many points in their clinical application are still undecided but it is possible now to formulate certain general rules in regard to preparation, dosage and time of administration. Since the Harvey Lecture of Sir Almroth Wright in 1907 the literature of the subject in our own country has grown extensively. An excellent series of papers by observers in different clinical fields may be found in the *Transactions of the Congress of American Physicians and Surgeons*, Vol. VIII, 1910. The résumé of Tileston or the more recent one of Stoner (*American Journal of the Medical Sciences*, February, 1911), may be mentioned. Major F. F. Russell has recently given an excellent address upon "The Control of Typhoid in the Army by Vaccination" (*N. Y. State Journal of Medicine*, December, 1910).

GENERAL CONSIDERATIONS. There has been much discussion as to the propriety of using vaccines in profound general infections but the brilliant results occasionally observed clinically have shown that with proper precaution their use should be strongly urged. Various theoretical reasons support the results of clinical observation. Kektoen and Carlson have shown that antibactericidal bodies are elaborated in the tissues and not in the blood. Park would emphasize that bacteria in the blood circulate with their antibodies and this may inhibit further production of antibactericidal substances; this would not hold true in the tissues. Theobald Smith has pointed out the possible local character of immunity-body production and has suggested the advisability of introducing vaccines into different tissues. Leary strongly supports the view of "the local character of many immunity responses" and advocates injecting vaccines into the muscles. Following the almost universal rule, I have preferred to inject subcutaneously, a convenient place being about the insertion of the deltoid.

METHOD OF PREPARATION. The procedure of Wright is well described in the article of Potter and Avery in *Hare's Modern Treatment*. There is a tendency at present toward sterilization at lower degrees of heat with shorter exposures, or to the use of chemical agents as carbolic acid or galactose in place of heat. "Bacterial proteins as well as others lose their specific character by exposure to high temperatures or by prolonged exposure to low temperatures" (Leary). Heating at 55° or 56°, certainly not over 58° for an hour should be advocated; Leishman is killing his typhoid cultures for preparation of vaccine used in the British Army by exposure to 53° for an hour. Weaver and Tunnicliff have demonstrated experimentally that a streptococcus vaccine, prepared by sterilization in 25% galactose solution produced a certain degree of immunity in rabbits while the vaccine sterilized by heat was inert. Vaccines certainly deteriorate with age and a good working rule is to reject all preparations more than 3 months' old.

SPECIFICITY. An autogenous vaccine is one made from the specific organism causing the infection in the individual case. It is always to be preferred to heterologous or "stock" preparations. In staphylococcus infections there is not so much objection to the use of stock vaccines as in the case of organisms

like the colon bacillus, pneumococci or streptococci which are subject to much variation through widely differing strains. Nearly all tuberculins are examples of stock vaccines and our treatment of gonorrhreal arthritis must usually be carried out with stock preparations. Gilchrist has shown that the staphylococcus albus vaccine may replace the aureus without loss of efficacy.

DOSAGE. The method of standardization introduced by Wright is still employed but it does not pretend to any great degree of accuracy and moderate errors in dosage are therefore unavoidable. The number of bacteria to be injected must depend upon the nature of the infection, the virulence of the infective agent, and the resistance of the individual. In acute general infections with profound toxæmia only small amounts must be given and the condition of the patient will alone determine the time and amount of subsequent doses. It must be remembered that the degree of immunity produced may bear no relation to the size of the dose, and that large doses in an exhausted organism theoretically may increase toxæmia and hasten a fatal issue. There is an undoubted tendency toward reduction of dosage even in local infections without marked systemic reaction, although, on the whole the dangers of large doses have been painted somewhat too vividly. In a case reported by Leary 10,000,000,000 staphylococci were injected by mistake, collapse followed in a few hours but the patient quickly rallied after stimulation. In another individual the same amount produced no reaction at all. Tileston has drawn up a table of dosage based upon the results of many different workers.

	in local infections	in general infections
Staphylococcus	100,000,000-1,000,000,000	
Streptococcus	5,000,000-200,000,000	5,000,000-25,000,000
Pneumococcus	10,000,000-200,000,000	20,000,000-50,000,000
Gonococcus	5,000,000-500,000,000	5,000,000-100,000,000
Bacillus coll.	10,000,000-200,000,000	10,000,000-50,000,000

My own experience has taught me caution in beginning treatment with large doses even in chronic infections. I have seen severe pain in the affected kidney follow an initial dose of 20,000,000 colon bacilli. In an interesting case of chronic typhoid bone lesions, inoculation of 40,000,000 bacilli of an heterologous vaccine gave a severe local reaction followed by fever and pronounced malaise and prostration. On the other hand we occasionally fail to see benefit from small doses and obtain prompt improvement from large ones. Three years ago a man entered my service in St. Luke's Hospital after an illness of two months characterized by irregular fever with chills and sweats. *Staphylococcus albus* was obtained several times in blood and urine cultures. The disease ran a course of weeks with recurrent paroxysms of chills and sweats, irregular pyemic temperature, crops of purpura and variations in size of a large splenic tumor. Ordinary drugs, enemata of collargolum had no effect. During six weeks treatment with an autogenous vaccine in doses of 50,000,000 to 200,000,000 no definite results were noted but after the amount was raised to 600,000,000 and 1,200,000,000 improvement was rapid and only three injections of the larger amount were required. The man has remained perfectly well ever since.

FREQUENCY OF ADMINISTRATION. The opsonic

index as a guide to the size and frequency of dosage has not proved of practical value. It may help to determine the nature of an obscure infection or may guide the choice of vaccine in mixed infections. As a rule in acute infections the interval between inoculations should be short and the dose small. In chronic infections an interval of 4 or 5 days has seemed to me better than one of 7 or 10.

STAPHYLOCOCCUS INFECTIONS. There can no longer be any doubt of the efficacy of vaccines in the control of local staphylococcus infections. Reports upon the treatment of furunculosis and carbuncles have been almost uniformly favorable. Here as elsewhere autogenous preparations are best but good results may be obtained with stock vaccines. The average dose is 200 to 300,000,000 to be administered every four or five days. Incision, hyperemia induced by application of the Bier cups, dressings of the solution recommended by Wright, 5% sodium citrate with 4% sodium chloride are helpful accessory measures. Staphylococcus albus vaccines have proved of benefit in the treatment of some forms of acne, in syrosis, weeping eczema and other skin affections. Gilchrist has found that superficial acne yields most readily to albus inoculations but the nodular variety due to infection with bacillus acnes requires treatment with autogenous vaccines in small doses 3 to 5,000,000 gradually increased at intervals of 7 to 10 days. In the treatment of chronic sinuses, chronic otitis media or chronic sinusitis due to staphylococcus infection favorable results have been reported. The case of septicemia due to staphylococcus albus has been noted above and one case of recovery from general infection with the aureus (following cellulitis of the hand) has since been observed. In four cases of malignant endocarditis due to the aureus, treatment was begun late in the disease and had no apparent influence on the course of the infection to its fatal termination. Deaver, DaCosta and Pfeiffer reported four recoveries in five cases of staphylococcemia following pelvic abscess, renal abscess, septic endocarditis, abscess of the scalp, pyonephrosis. In three cases of severe toxemia following suppurative nephritis, phlebitis, appendicular abscess recovery was prompt in two cases. From one to six doses of 100,000,000 were required at intervals of 4 to 6 days.

STREPTOCOCCUS INFECTIONS. The variability of streptococcal strains makes treatment with stock vaccines, even though polyvalent, much more unsatisfactory than in staphylococcus disease. The more rapid spread of the infection and the more profound intoxication usually accompanying it, make control even by autogenous vaccines less satisfactory. Infected wounds, abscesses, empyema, puerperal septicemia, malignant endocarditis are the conditions the clinician will most often be called upon to treat. In erysipelas no very striking influence has been exerted by vaccines. I have seen two cases get well in about the usual time under treatment with autogenous preparations. It is a disease notoriously of variable virulence in different years and opinions as to efficacy of a particular method of treatment must be uncertain. Important work is being done in preventive inoculations against scarlet fever but it is

yet too early to say whether the method will prove of sufficient value to warrant general introduction. Smith (*Boston Medical and Surgical Journal*, 1910, CIXII, 242), has recently collected the literature on the subject. Weaver concludes from his work with streptococci killed by galactose that injections early in the course of scarlet fever do not prevent later streptococcal complications; subacute and chronic streptococcal complications of infectious diseases are sometimes favorably influenced; acute processes are as a rule unaffected. I have seen two cases of puerperal septicemia apparently marvelously cured by autogenous vaccines; in one case streptococci being cultivated from the blood. One injection of 50,000,000 was given in one case, three injections of 20, 60 and 100,000,000 were given at intervals of 4 days in the other. Leary (*Boston Medical and Surgical Journal*, 1909, CLXI, 741), reported a series of 47 cases with 4 deaths; Hartwell Streeter and Green (*Surgery, Gynecology and Obstetrics*, 1909, IX, 271), reported 18 cases in all of which recovery took place. The favorable result in puerperal cases is probably due to the fact that the chief infection is local and symptoms are due largely to toxemia. Interesting in this connection is the observation of Libman in the study of general infections arising from the complications of otitis media that bacteria disappear from the blood if the local condition is properly controlled. Less favorable results have been reported in the treatment of general streptococcemia though some apparently hopeless cases have been rescued. Da Costa treated two cases of malignant endocarditis and one case of general infection following cellulitis without effect. Wright in 1907 reported six cases of streptococcus endocarditis with 4 deaths. In the collection of Stoner out of 26 cases of acute ulcerative endocarditis 22 were due to streptococcus infection; of the 26 eleven were cured. Six cases of septic endocarditis and one case of streptococcus pyemia were reported by Gilman Thompson (*American Journal of the Medical Sciences*, CXXXVIII, p. 169). "In several of these cases polyvalent vaccines were employed, but without benefit, before homologous vaccines could be obtained, which latter proved effective." Three cases of malignant endocarditis and one of pyemia were cured. The dosage varied from 50 to 300,000,000 and injections were made sometimes on succeeding days, usually at intervals of 5 or 6 days. The writer has seen 2 cases of malignant endocarditis treated with autogenous vaccines in doses of 50 to 100,000,000 without benefit.

Perhaps in future better results may be obtained in streptococcal infections from vaccines sterilized at lower degrees of heat. Leary advocates short exposures to heat and Weaver employs 25% galactose solutions in sterilization with apparent increase in immunizing power. The dose of streptococcus vaccine varies with the severity of this infection. In general infections begin with 5 to 20,000,000 every 2 or 3 days, in local infections larger doses 20 to 50,000,000 may inaugurate the treatment. Subsequent doses of 100 to 200,000,000 may be given and the interval determined by the results on temperature curve and general symptoms.

PNEUMOCOCCUS INFECTIONS. Pneumonia, empyema, malignant endocarditis, the complications of otitis media, meningitis are the chief conditions here in question. Pneumococci, like streptococci, vary widely in different strains and autogenous vaccines should be employed. In pneumonia organisms can usually be recovered from the blood but Leary advises vaccines prepared from the sputum. My cases have been too few from which to draw conclusions. The vaccine has been administered every 24 or 48 hours in doses of 10 to 20,000,000 or, as advised by Leary 5,000,000 every 8 or 12 hours. The results reported by Leary (loc. cit.) and by Craig (*Medical Record*, 1910, p. 259), are remarkable. It must be remembered of course that we all see desperate cases of pneumonia, get well under indifferent treatment, and that the mortality from the disease varies greatly in different years. Occasional benefit has been seen from vaccines in pneumococcal empyema and the treatment should be tried in all cases with chronic sinuses.

GONOCOCCUS INFECTIONS. Dieulafoy has reported two cases of gonococcal septicemia caused by vaccine therapy; gonococci could be cultivated from the blood long after disappearance of symptoms. Miller reported one case cured, Eyre one improved, Irons three not affected. As a rule more is to be expected in the treatment of the chronic rather than the acute in the metastatic rather than the local manifestations of the disease. In the vulvovaginitis of children excellent results have been obtained by Hamilton, Churchill and Soper and others. Hamilton recommends injections of 50,000,000 every 5 days increasing gradually to 100,000,000 and repeating this maximum dose every 10 days. There can be no doubt of the value of the vaccine in chronic gonorrhreal arthritis. It is often impossible to obtain an autogenous vaccine and stock preparations from different strains must be employed. The writer has seen definite benefit in a few cases. In recent infections begin with 20,000,000 and increase to 200,000,000 or 400,000,000 fairly quickly if no unfavorable local and general reactions are obtained, injecting every 5 or 7 days. In chronic cases larger doses 500,000,000 to 800,000,000 may be necessary before improvement is noted.

TYPHOID BACILLUS. The prophylactic inoculation against typhoid, first introduced by Wright, promises in its modified form to be of great value. The above mentioned article of Russell gives an excellent account of the preparation and administration of the vaccine and of its use in the United States Army. Spooner working under Richardson's direction has inaugurated the routine administration of preventive inoculations to the nurses and house officers in the Massachusetts General Hospital. Russell advocated an initial dose of 500,000,000, a second of 1,000,000,000 in ten days and a third of 1,000,000,000 at the end of 20 days. No very definite results have been reported in the treatment of typhoid. Richardson thinks vaccines properly used will prevent a large percentage of relapses. Other writers think the course of the fever has been milder. The writer has seen no apparent result in some half dozen cases.

I have been able to collect accounts of eight cases

of typhoid carriers reported cured by the use of vaccines. If substantiated by further investigations the importance of the matter can hardly be overestimated. Not only is a check given to the spread of infection but the possibility of control of many cases of chronic typhoid cholecystitis seems offered. In two instances under my observation osteoarthritis of the spine developing not long after typhoid has seemed promptly and decidedly benefited by heterologous typhoid vaccines. In a case of obstinate recurrent bone lesions in which repeated operations had failed to cure an initial dose of 40,000,000 killed typhoid bacilli occasioned a distressing general reaction marked by depression and malaise for days. Subsequently treatment was begun with a dose of 1,000,000 and this was very gradually increased until a dose of 100,000,000 was reached. The affection has apparently been completely controlled.

COLON BACILLUS. There are many members of the colon group and whenever possible autogenous vaccines should be used in treatment. Infections of the urinary tract, sinuses persisting after abdominal operations; certain forms of colitis are the conditions most often requiring the use of vaccines. I have seen a fairly large number of acute infections of the bladder and pelvis of the kidney in women and children. It is my impression that such cases get well as quickly under general medical measures and hexamethylenamin as with use of vaccines. In chronic cystitis, pyelitis or pyelonephritis my experience has been that of others—that symptoms are greatly relieved, that in rare instances complete cure results but that usually bacilluria persists. Possibly long continued use of vaccines would finally clear up the infection. Recent work of Michaelis confirms the observation of Wright as to the agglutination phenomena of colon bacilli in the urine under the influence of autogenous inoculations. In a recent series of 30 cases of infection of the urinary tract reported by Hugh Cabot 25 were due to the colon bacillus. Vaccine treatment relieved symptoms in 19 while 11 were uninfluenced. In 27 bacteruria still persisted in 3 instances organisms had disappeared. The frequency with which tuberculosis is found associated with chronic colon infections of the urinary tract must be borne in mind and the proper treatment with mixed vaccines instituted.

I have seen two cases of chronic cholecystitis apparently much benefited by the use of colon bacillus stock vaccines in the past two years. Wright and Reid, Turton and Parkin have reported cure in acute cases of cholecystitis and cholangitis from the use of autogenous vaccines. Favorable results have been reported in the treatment of various diseases of the colon, ulcerative and membranous colitis, and English authors write of benefit to many indefinite symptoms of questionable relation with disturbances of the colon. The initial dose of colon bacillus vaccine should be from 10 to 20 millions. The amount may be increased quickly to 50,000,000 or even 100,000,000—the interval between injections should be from 5 to 7 days.

It is impossible to write of all the conditions in which treatment by vaccines has been recommended. Wynn, Cobb and others have treated actinomycosis successfully. Pyorrhea, asthma, bronchiectasis, acute

nephritis, prostatitis, many skin affections in addition to those just mentioned, common colds, sinusitis—all these have been reported benefited by autogenous or stock vaccines. The writer has seen improvement in two cases of chronic influenza, but variations in the course of this infection may be frequently observed under almost any treatment; in some of the cases regarded as chronic influenza I am of the opinion that the influenza bacillus is merely saprophytic and not the cause of pulmonary symptoms.

The report of Coakley and Kendall upon vaccines in chronic suppuration of the nasal sinuses is not encouraging; that of Reik upon vaccines in otology is equally unenthusiastic. In a series of 40 cases of middle ear suppuration communicated by Miss Nagle working with Cobb of Boston discharge had existed for a few months and in 34 from 1 to 40 years. Cure was obtained in 39! Injections were made at intervals of 3 days of autogenous vaccines sterilized at low degrees of heat in the shortest possible time. On the other hand Dr. Alice Hamilton of Chicago treated a number of cases of middle ear disease following scarlet fever; those treated by vaccines did well but no better than another group of cases with routine cleansing as the only therapeutic measure.

Reports like these make it difficult as yet to pronounce final judgment on the clinical value of vaccines. My own opinion, though not extremely enthusiastic, is that they offer a very decided addition to our resources in the treatment of infections and their complications. There is great need of more careful preparation of autogenous vaccines and of proper clinical supervision of dosage and frequency of administration. The indiscriminate use of stock preparations without proper determination of the nature of the infection is strongly to be condemned. I have seen several cases of syphilitic and tubercular arthritis being treated with gonococcus vaccines. One great danger of the multiplication of easily administered remedies supplied by drug houses lies in the neglect of careful diagnosis. Sober judgment should realize the limitation of the new method and not expect it to displace older forms of treatment. I have seen a patient being treated enthusiastically with vaccines for pneumonia with one side of the chest half full of pus. In another case colon vaccine was being given for the cure of pyuria while a pyelitis was being maintained by calculi in the kidney. Treatment with vaccines must supplement and not supplant well recognized surgical procedures. In light of our present knowledge no one has a right to delay operation on an acute mastoid of pneumococcus origin with the hope that vaccines may cure the infection. The infected gall bladder with cholelithiasis must be operated upon, the appendix abscess opened, the empyema drained before much help can be expected from vaccines.

Discussion.

Dr. C. C. Warden, Los Angeles: An expression of personal pleasure and profit derived from hearing Dr. Gay's valuable and timely paper must be my first duty. Coming from a source of such unquestioned authority and immense experience in biologic experimentation, the paper claims added value and distinction. The presentation deals with the sub-

ject historically, critically, and suggestively. The writer has given due credit to Jenner, Pasteur, Pfeiffer and Wright, and to that list should be added Bordet, Gengou and Gay. Wright's method and theory have been presented in clear outline and with very just criticism. The opsonic index as Wright commended it has ceased to be a practical guide to clinical work, but it served to introduce the phagocytic index of diluted sera and the curves to be plotted therefrom; a valuable but still impracticable laboratory method of studying individual immunity response.

As the author states, Wright did not fortify his work with animal experimentation. Were I permitted to select from the paper but one assertion to emphasize, it would be, in his own words, "Animal experimentation offers the only possible method of acquiring a complete series of facts and any consequent deduction as to the cause of biologic phenomena."

What are the principles of vaccine therapy? Allow me to present them as I see them. First, an indifferent, non-specific and natural immunity toward most organisms exists in most of the tissues of the body. Excessive numbers of organisms or increased virulence of bacteria may overcome this immunity but it is this natural cellular immunity and phagocytic activity that make vaccine therapy possible. Second, an infection is primarily local. Even when bacteremia results from a primary focus there are tissues which seem to be elective to bacterial growth, and bacteria are destroyed in, and by, a majority of the tissues. For example, consider pneumococcus or streptococcus sepsis. There is endocarditis and the blood is laden with bacteria, but abscesses in the spleen are almost unknown despite the fact that infective heart emboli find their commonest stopping place there. The same is true of lung, liver, brain and muscular systems. Animal experimentation has shown that it is not the circulating blood of itself which destroys organisms, nor indeed the unfortified leukocytes in it, nor the specific cells of the various tissues (save the hemolymph apparatus) but the endothelial cells of the capillaries in the organs and the fortified phagocytes in the tissues. Third, when bacteria have once come to thrive in a tissue, that tissue is no longer immune, and help will come not from increased destroying power of that tissue but by aid from the other tissues of the body; tissues of the body, not blood itself, for even toxins in the blood rapidly disappear. Toxins in the blood of one animal transfused into another animal produce no antibodies in the recipient, but the original toxin-bearing animal begets antibodies although deprived of its own blood.

These are the main principles, underlying all of which the leukocytes and phagocytosis constitute an active agency. These principles lead us to inject killed or live cultures into an infected individual in a part away from the original site of infection in order to produce, first, a local antibacterial, phagocytic and antibody reaction, followed by a general one. Is it not true that blood infection is, in a sense, a local infection, and that in a tissue which is almost wholly immune to bacterial influence? At any rate it is but a step beyond a local infection and why not administer vaccines for this infection as well as another. It is not irrational, on careful examination. The subcutaneous tissues which we inoculate are seldom attacked in general infections. They constitute a large, local lymphatic storehouse and laboratory, admirably detached, and fitted as a factory for antibody and phagocytic activity.

Granted then, that vaccine therapy is indicated in local infections, and bearing with me in the contention that vaccines are applicable in the other extreme (sepsis), what disposition is to be made of those infections with profound toxin exhibition like pneumonia, typhoid, etc.? In these infections the fatal event is either from accidental causes like hemorrhage or heart failure or complications or is determined by toxic action on nerve centers rather

than by exhaustion of the tissues. Paralysis and exhaustion of the tissues are shown by lowering of the body temperature. Temperature itself, barring hyperpyrexia, is an index of healthy tissue response to a toxin. Give vaccines in small quantities into subcutaneous tissues in conditions where temperature is normal or within limits above normal. The system benefits by the slight rise of temperature following such inoculation.

On the other hand, a purely local and very slight infection may be accompanied by profound intoxication, an intoxication as profound, or more so, and as sudden and overwhelming, as may occur in pneumonia, typhoid and septicemia. Vaccines are contra-indicated in all infections where intoxication is so heavy as to have produced tissue exhaustion, shown by feeble and failing pulse and lowered temperature and vitality. In such cases, truly, vaccines only add fuel to the fire.

THE SURGICAL SIGNIFICANCE OF PAPILLOEDEMA.*

By LEON WALLACE MANSUR, M. D., Los Angeles.

The subjects of papilloedema and intracranial pressure from all causes, with decompressive operations for these conditions, have been so much written about in all the medical journals during the last few years that we are all more or less familiar with them.

Bordley¹ says that next to headache, choked disc or papilloedema is the most common symptom of brain tumor. Mr. Leslie Paton² in an analysis of 200 of his cases found papilloedema in 80%. De Schweinitz³ found it in 85% of his cases. Other surgeons agree with them so closely that we can safely state that 80% at least of all cases of increased intracranial pressure probably have papilloedema.

The surgical significance of papilloedema is that we have to do with an increase in intracranial pressure from some cause, as new growth, abscess, cyst, hemorrhage, etc., and that unless the tension is relieved before destruction to the brain tissue and nerves occurs, the results of this destruction will become permanent and we will have various paralyses depending on the part of the brain involved, and blindness from the pressure on the optic nerves. For this latter reason the early recognition of papilloedema is of so much importance to both the patient and to the surgeon that too much cannot be said of having an early fundus examination in every suspected case.

It is now a pretty well recognized fact that the condition we know as choked disc or papilloedema is a simple edema of the optic nerve and is caused by intracranial pressure. I can best describe this condition by quoting directly from Mr. Leslie Paton's⁴ paper on the pathology of papilloedema:

"This edema is due to two factors, venous congestion and obstruction of lymph outflow. The venous congestion is due to the rise in intravenous pressure which takes place in the central vein to correspond to the raised sheath pressure which in its turn is due to the raised intracranial pressure. Beyond the lamina cribrosa the central vein with raised intravenous tension comes to a tissue no longer subject to raised sheath tension (the vitreous) and the disproportion between intravenous tension and tissue tension leads to increased exudate of lymph. At the same time the drainage of lymph

from the disc is interfered with by the increased sheath tension and a consequent accumulation of lymph in the disc tissue takes place."

Shieck⁵ from his observations and experiments agrees that there is no inflammatory process in the nerves, but that it is a simple edema. He further states, however, that the simple raising of the intracranial pressure will not produce the lesion alone, but that there must be also an increase in cerebrospinal fluid. This latter does not seem absolutely necessary to us, as the normal amount of cerebrospinal fluid present might be sufficiently compressed by a very large or rapidly appearing tumor. In fact, Bordley and Cushing⁶ state in their experimental work that it may be caused "by transmission of pressure to the fluid already present," and later on in the same article that they produced the same results by digital compression on the dura through a trephine opening, and within the course of a few minutes observed a swelling of two dioptres occur in the nerve head.

Shieck also says that when fluid is injected into one side of the skull the fundus on that side is most violently and first affected. As regards the surgical significance of papilloedema this last statement is of the greatest importance to the surgeon, as when it comes to opening the skull for the relief of the tension and removal of the tumor, everything which can help us in localizing this tumor must be most carefully considered.

Fortunately we would ordinarily have paralyses and other symptoms in various parts of the body which would unquestionably aid us in our localization, and we would not be dependent on the eye symptoms alone.

Bordley and Cushing⁷ in their experiments with the injection of fluids into the sub-dural space say they have seen the edema of the disc occur first in the opposite eye and later followed by equal changes in the homolateral eye. Sir Victor Horsley⁸ says nothing less could have been expected from the Manz method (injection of fluid) which they employed. He thinks that while this introduction of fluid is of the greatest importance as the mechanical factor in producing the lesion, that we cannot rely absolutely as to which side it will first occur on. Sir Victor Horsley⁹ was one of the first to call attention to the fact that the papilloedema was first seen on the homolateral side and that the greatest amount of involvement to the nerve was also homolateral. He thinks that in nearly every case the side on which the tumor is located can be determined by a careful examination of the fundus changes.

Paton¹⁰ in an analysis of 252 cases found 84% on the homolateral side, but on account of the 16% contralateral thinks we cannot be sure from this alone. De Schweinitz¹¹ and Holloway say that in the majority of their cases the greatest amount of swelling was on the homolateral side, but that with Horsley, Cushing, Bordley and others they agree that other things besides the swelling must be taken into consideration.

We must carefully examine the fundus as to which nerve was probably first affected; the position of the swelling will here help us as it occurs first in

* Read at the Forty-first Annual Meeting, State Medical Society, Santa Barbara, April, 1911.

the upper nasal quadrant and appears last in the lower temporal. We also look for signs of beginning or advanced atrophy, and to see whether we have any hemorrhages or other changes in the fundus.

We must carefully examine the vision in each eye with the refraction corrected for the best visual acuity.

We must also examine the fields for contractions and changes in the color fields. Bordley and Cushing¹² found that the blue field, which is the largest of the color fields, was the one most commonly and most markedly affected. It was always contracted, at times interlacing with the red and green fields and sometimes so contracted as to be well inside both the red and green.

This color inversion, or dyschromatopsia, was formerly supposed to be due to hysteria alone, and in fact up to this time has been used as one of the differential diagnostic points between hysteria and organic cerebral lesions. Now, however, that these changes in the color fields have been found so constantly in increased intracranial pressure, and to return to normal on the relief of this condition, we have another very valuable diagnostic sign.

He also says that in four of their cases they found the dyschromatopsia to precede all the other changes. On the other hand, in six of their cases (250 in all) no disturbance of the color fields were found. This shows us that, as in other conditions where one element of a symptom complex is wanting, if dyschromatopsia is present it is a valuable aid in our diagnosis, while if absent it is simply negative evidence and we must rely on the remaining symptoms.

In a later article, Cushing¹³ says: "We have, indeed, come to place so much confidence in this phenomenon as an early indication of increased intracranial tension that in a few cases we have ventured to operate at a stage before choked disc had occurred, and in two cases at least the successful extirpation of a small tumor at an early date has been due to our growing faith in the reliability of the sign."

For the purpose of deciding when to interfere surgically in order to preserve the best vision for the patient, papilloedema has been divided into various stages. We think the best is De Schweinitz's¹⁴ modification of Mr. Marcus Gunn's arrangement. In this we have for the

1st. Increased redness of disc, with loss of definition of edges. Slight prominence of surface, beginning filling in of porous opticus.

2nd. Edema of the nerve head, disappearance of the porous opticus, complete obscuration of the disc margins, moderate haze of surrounding retina and uneven distension of the retinal veins.

3rd. Decided increase of edema, elevation, and size of the nerve head, striae of edema in the form of lines in the swollen retina between the disc and macula, marked distension of the retinal veins and a few retinal hemorrhages.

4th. Increase in prominence of disc, which now assumes a mound shape and begins to lose its reddish color and to become opaque, exudation in and on

the disc and surrounding retina, elaboration in size and number of retinal hemorrhages.

5th. Decided subsidence of the vascularity of the papilla and increasing pallor with or without sinking of its prominence, shrinking of the arteries and thickening of the perivascular lymph sheaths, areas of degeneration in the retina especially in the macula region.

From this last stage we pass rapidly to the so-called post-papillitic atrophy.

In the first three stages the chances of preserving the vision are very good by operation, in the fourth while more or less permanent changes have taken place in the nerve and fundus we may still get useful vision, enough for the patient to get around by himself. In the fifth stage operation for saving vision is nearly hopeless, although it may relieve the patient of much discomfort. It is justifiable, however, as without operation he will surely become blind, and even if a vision of shadows is saved for him it is infinitely better than being in the dark for the rest of his life.

In conclusion we wish to call special attention to the following points:

1st. That papilloedema is one of the most common symptoms in increased intracranial tension, that unless this pressure is relieved before destructive changes occur the patient will become blind and hence the importance of an early recognition of this condition and an early operation for its relief.

2nd. The significance of dyschromatopsia and the importance of a most careful examination in all the cases we are inclined to call hysterical.

In connection with this last I should like to read you a case which Bordley and Cushing report in their article on dyschromatopsia:

"One of our recent patients in whom a temporal lobe tumor was disclosed at operation has in her possession a letter from a distinguished neurologist, written only a few days before the operation. From it we take the liberty of quoting a few sentences:

"I had the eyes examined in the first place in the fear of there being some choroidal changes due to nephritis, and incidentally the fields of color and vision were taken. A little to my astonishment we found complete reversal of the red, green, and blue fields with great contraction. This is a condition which I think may be said to be thoroughly characteristic of hysterical trouble and to be exceptionally rare—almost unknown—in any other condition. Additional suggestions of this same condition are these: the corneal reflexes are subnormal and the whole left side has subnormal sensation to pain, etc.

"While these hysterical symptoms are very distinct, and, as I said, due in my experience to no other condition, it seems to me at least probable that there is also a genuine slight loss of power on the left side, probably from a stoppage in a superficial vessel; and to this there have been added these hysterical manifestations. They were rather unexpected to me, as Mrs. _____ seems to be a person with self-control and calm decision. . . . I should treat her with massage . . . to prevent any tendency to contracture, which follows as certainly on hysterical paralysis as on cerebral or spinal ones."

"This letter we think is fairly representative of the views which are generally held in regard to these matters.

"Doubtless disturbances of the color fields have been observed heretofore in patients known to have brain tumor, but so far as we are aware they have

never been commented upon as being characteristic of any condition other than hysteria."

¹ Bordley, Jas. J. Ophthalmoscope, vol. IX, p. 9. Early recognition of choked disc.
² Paton, Leslie. Brain, vol. XXXII, p. 67.
³ De Schweinitz. University of Pennsylvania Medical Bulletin, April-May, 1906.
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THE DIAGNOSIS OF CERTAIN INTRACRANIAL LESIONS.*

By THOS. J. ORBISON, M. D., Los Angeles.

I wish to consider briefly certain lesions of various portions of the brain and dwell upon the diagnostic points which seemed to be either essential or germane. To this end I shall use, when possible, the clinical material which I have at hand, both in the form of histories of cases and specimens of brain lesions.

TUMOR OF THE CEREBELLUM. Dr. Herman Hoppe, in a paper read last year before the section on Nervous and Mental Diseases of the A. M. A., said: "I believe that we can say with some accuracy, whether a growth is in the pons or the region of the corpora quadrigemina, and I believe that the diagnosis of growths in the cerebello-pontine angle can be made with almost equal facility; but the great stumbling block is offered by tumors of the cerebellum itself." In addition he emphasized the great difficulty and the great necessity of an early diagnosis in these cases. A very interesting and instructive case in point will serve to illustrate precisely his proposition:

Case I. W. S., Aet. 30 yrs. Telegrapher. 6, 21, '09. Ref. to me by Dr. Weherly, Santa Ana. Family history is good except that the patient had an imbecile brother. P. H. He has been married ten years; has two healthy children; his wife has never had a miscarriage; he denies syphilitic infection. He has always been healthy and abstemious as to food and drink.

Up to November, 1908, he felt quite well, but during that month he began to notice the first symptoms of trouble: First symptoms (while living in Minnesota): There began a tendency to anorexia and, later, vomiting. This was noted just after meals and generally in the morning. Soon after began a peculiar feeling which he described as a "prickling feeling" at the back of the neck; worse on getting out of bed but wearing away later.

Second stage symptoms: He now began to show a tendency to veer over to the left side of the road or path or railroad track as he went to and from his work. He only became alarmed when told he might



Fig. 1. Case I—Cerebellar tumor.

be developing a cancer of the stomach and went, in January, 1909, to a surgeon for a careful examination. No gastric lesion was found and he was sent back to his home as a neurasthenic. (His eyes were not examined).

Third stage symptoms: In February, 1909, he first noticed some disturbance of vision, e. g., the lines of the pavement would seem broken and twisted; small objects would elude him. In March he came to California. All his symptoms continued to be progressively aggravated, with now and then a remission. In March he first noticed diplopia. This and the increase of staggering caused him the necessity of a cane.

Fourth stage symptoms: In April, 1909, he first noted tremor of his left arm. (This has persisted and is of the intention type).

Fifth stage symptoms: For the last two months (May and June, 1909), he noted first some tinnitus in the left ear, then increasing deafness in the same side.

Gait: He walks with feet far apart and only by the help of a cane. When it is taken away he staggers like a drunken man—and always to the left. As he sits in a chair his head is held at an angle, chin to the right and top of head to the left with left ear approximating the left shoulder (cerebellar attitude). Station is very bad with eyes open or shut. While in prone position he can turn either way without discomfort. When told to look quickly over his left shoulder, he experiences a peculiar dizzy feeling. Pupils: Equal and react sluggishly to light and in accommodation—(the eyes do not converge). There is slight internal strabismus of left eye. The left side is markedly ataxic. Eye grounds were examined by Dr. C. H. Montgomery (intersection of fields plainly seen). Ears were examined by Dr. Hill Hastings: His findings showed a central deafness of left nerve; no involvement of cochlea and labyrinth.

A diagnosis was made of cerebellar tumor or cyst; left sided; beginning in body of left lobe but impinging upon the cerebello-pontine angle of same side. Prognosis was very grave, but operation was requested by the patient to be done at once. The diagnosis was borne out at the operation, performed by Dr. Lobinger (at which the lesion was found but not removed); and by the post mortem findings, as the patient died about nine hours after the operation. It was one of those inoperable tumors growing within a cyst and the diagnosis had not been made early enough to be of much use to the patient.

* Read at the Forty-first Annual Meeting of the State Society, Santa Barbara, April, 1911.

I have gone into this history at such length for two reasons—it emphasizes again the fact that the classical symptoms of brain tumor are for too long a time treated as being merely symptoms of "nervous dyspepsia," neuralgia, "chronic gastritis," or neurasthenia,—as was the case in this instance. Secondly, it demonstrates so many interesting symptoms of intracranial lesions.

I. We have here the adducent involvement with strabismus and diplopia which was such a baffling symptom until Harvey Cushing gave what seems to be the first explanation backed up by clinical and post-mortem findings. In a paper on "Strangulation of the Nervi Abducentes by Lateral Branches of the Basilar Artery in cases of Brain Tumor" (Am. Neuro. Asso., 1910), his conclusions were—1. That the arteries, contrary to the usual anatomical descriptions, generally *overlie* the nerves, 2. In a series of brain tumor cases the vessels which normally encircle the brain stem often produce a more or less



Fig. 4. Case IV—Vertical section through frontal lobe.

deep grooving of the nervous tissues. 3. The abducentes, in many of these cases, are constricted. 4. A large percentage of clinical histories of cases which show post-mortem a pontine grooving, with accompanying implication of the nerves, record subjective diplopia or an actual presence of a convergent squint observed during life. Before this the generally accepted opinion was that the abducentes on account of their length and direction were more apt to torsin during intracranial pressure. The case I have cited showed this grooving by the left 6th nerve which was due to an overlying artery, with constriction of the nerve.

II. Another symptom of interest is the interlacing of the color fields—shown so well in this case by Dr. Montgomery's findings and in another by the findings of Dr. Lewis Thorpe, in a case of cerebellar cyst in which I made a neurological examination for Dr. Lobingier.

Two years ago it was brought out very clearly by de Schweinitz, Mills and Cushing that such interlacing was to be regarded as one of the symptoms

of intracranial growths. But it was not so very long ago that this interlacing and inversion was considered pathognomonic of hysteria—confounding it with the hysterical symptoms of tubular vision and diplopia with but one eye open.

III. A third symptom that aided in the diagnosis was the "cerebellar attitude" referred to above—the top of the head being held toward the lesion.

IV. The very interesting progress of the symptoms allowed us to make the diagnosis that the tumor was cerebellar and left sided; that it began in the lobe, but (because of the late involvement of the 8th nerve) that it had impinged upon the cerebello-pontine angle.

V. Now, as to other symptoms of intracranial tumors in general which have been a great help in certain cases of *obscure* tumor this was one brought out by Dr. Spiller two years ago; he writes: "Provided there are no indications of cerebral abscess, *progressive hemiplegia*, or *hemiplegia of gradual onset* (in which weeks or a few months elapse before the paralysis is complete) may be regarded as strong evidence of cerebral tumor—even when optic neuritis is absent; or when optic neuritis, headache, and vomiting are all absent." Not only tumor but also encephalitis will, however, develop the same symptom or a modification of it and I will cite a case in this connection:

Case II. M. W. Aet. 4 yrs. Ref. by Dr. Lobingier, for examination. Family history was good. Patient was born asphytic, but resuscitated. He seemed normal up to three months when he became suddenly ill following a fright. He was feverish, irritable, refused nourishment and developed convulsions. The acute stage lasted about one week. From that time on he has had convulsions—3 or 4 a day for the last 7 months beginning in his right hand. At the age of about one year it was noticed that the head began to increase in size. (Internal hydrocephalus). Six months ago he had a bad series of convulsions; since then he has been very irritable, bites himself on the hand and cries out (arrested development). For the last year his mother has noticed an inability to use his right hand at all well. Close questioning and observation bring out the fact that the convulsions always begin in the right hand.

Examination showed a child with a massive head; no exophthalmos; poor mentality; astasia abasia; inability to articulate. The right arm shows athetoid movements and he does not grasp objects with his right hand.

A diagnosis of encephalitis was made and the lesion placed in the motor area of the hand and arm of left side of the brain. The parents were told of the situation and warned that an operation might reduce the spasms to a large extent, but small hope was given for much increase in mentality because of the obvious conditions of cerebral insult.

An operation was asked for by the parents and performed by Dr. Lobingier. An area of old encephalitis was found at the point designated. The brain was very much waterlogged. The lateral ventricles were tapped and at once the brain pulsated nicely. The area of degeneration was excised and adhesions relieved. The child did very well up to last reports. There cannot be much hope, however, for very much permanent improvement; but the operation did fulfill all the promises held out to the parents.

TUMORS OF THE FRONTAL REGION. A case was referred to me by Dr. Broughton within the month that was intensely interesting as being a *probable* involvement of the frontal lobes.

Case III. Mr. G. Aet. 37 yrs. M. Salesman. Family history good. Previous health, except for severe pain in the neck, always excellent and robust; and he absolutely denies syphilis.

He came to California on account of his wife's health. Within the last six weeks, and especially within the last three weeks, he had developed an entire change of personality. He seemed to be constantly under the influence of some drug. His speech became slurred and slowed; he was somnolent most of the time; he developed mild grandiose symptoms. When seen first, his eyelids were half open and as he smoked his cigar it would go out. At times it would drop from his hand. There was some uncertainty as to his gait. That was the whole picture. His eye grounds were examined by Dr. C. H. Montgomery and found to be normal. His pupils were equal and reacted normally. His K. J.'s were much exaggerated. No Babinski found. Vision was good. There was some flattening of the naso-labial folds on both sides.

One point of diagnostic interest was that there have been decided and almost total remission of his symptoms—only to recur again.

This case did not show either headache, vomiting or optic neuritis, and yet I made a provisional diagnosis of frontal lobe involvement, and will keep the case under observation for localizing signs. The diagnosis was tentative but the absence of pupillary rigidity, the presence of exaggerated K. J. and sudden onset of mental symptoms helped to determine the diagnosis of organic rather than mental disease. (Analogous to this case were three reported two years ago by Spiller, in America, and one last year by Couran, in England).



Fig. 5. Case V—The small tumor on the right was the primary tumor in the testicle.

A Wassermann test will be made in this case when we can get the patient's permission.

Case IV. Male, age 30, single. January, 1910, had double vision (abducent involvement), and partial loss of eyesight (optic neuritis). In March, 1910, he complained of general weakness with headache for three weeks and was totally blind (double optic neuritis) for ten days. Vomited once with nausea. Eye grounds showed optic neuritis in both eyes. Then his strength and eyesight gradually improved (accommodation to pressure). In April and May six short attacks of aphasia. Spells of shivering, possibly convulsions. May: left eye became totally blind, right eye had perception of light.

Coordination of hands good. Station fair. Feels tendency to fall to the left and forward. Left knee jerk greater than right. Slight left ptosis and lateral nystagmus.

A decompression operation was performed July 9th. August 22nd, had a delirium for one week followed by unconsciousness.

October 30th: Paralysis of left side, first in the foot, then leg and then hand and then face. Died November 8, 1910.

Autopsy showed a glioma invading the left frontal bone.

Case V. Metastatic Cancer in Motor Zone: primary lesion in the testicle. (Specimen from Hendrick Lab.) J. H. Young adult. Laborer by occu-

pation. Two weeks previous to the first examination while digging a cesspool was injured on right side of head by a falling timber; was not rendered unconscious but was dazed and did not work any more that day. Next night had an attack of diarrhea and vomiting. A few days later developed aphasia.

Sept. 21, '09. Had violent epileptiform seizure. Right arm slightly paralyzed for a few hours. Attention was called to enlarged testicle which upon examination proved to be a testicle enlarged to four times, an entire absence of pain or soreness, with a history of having been growing for about two months.

Sept. 22, '09. Had another seizure. Again there was paralysis of right arm.

Oct. 6, '09. While he had no more seizures, he became gradually weaker and more restless, had severe headache and marked aphasia; progressive paralysis of right leg developed and patient lapsed into semi-unconscious state.

Post mortem findings. Circumscribed tumor making pressure from within outward upon motor area. The large testicle on section showed the same general appearance as did the brain tumor. Microscopic examination showed tumor to be carcinoma, metastasis in the brain.

Case VI. Secondary lesion of brain following tumor burrowing into antrum.

Patient, man, 51 years. Admitted to County Hospital February 12th, died February 17th, 1911. Complaint: Unable to move arm and leg. Family history negative.

Eight or ten days ago walked out to Saugus in rain and had chill that night. He vomited before he

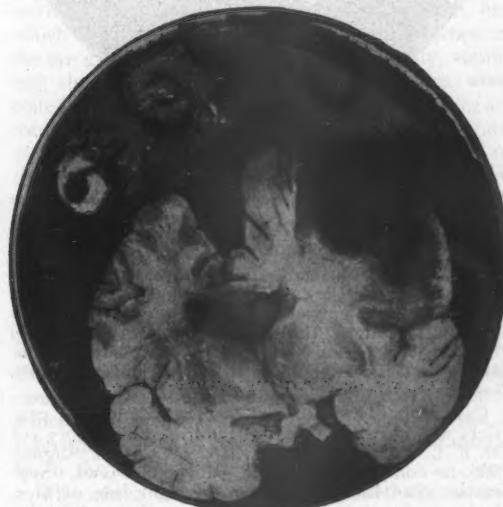


Fig. 6. Case VI—Showing the primary tumor attached to the eye.

went to bed; also noticed that he could hardly untie his bundle. Next morning noticed dull ache in right side of head. He noticed some trouble with right eye at that time, but thought it was due to cold. Has not noticed any trouble in speech or in swallowing. Next morning walked back to Los Angeles. His left leg felt limp and weak, but patient walked out to hospital from town. He noticed no trouble with vision and has had no pain.

Patient well nourished. Exophthalmos of right eye—eyes react to light and accommodation; no limitation of motion; no pulsation; pupils equal. Discharge from right side of nose and pain on pressure over frontal sinus. Drooping of left corner of mouth. Patient has partial wrist drop on left side. He can raise the arm even with shoulder and flex and extend forearm slowly and can raise the hand slightly. Sensation is not always certain below wrist; he can tell if his hand is gripped, but not

which finger is touched. Leg: reflexes present; sensation normal; no Babinski or ankle clonus; no limitation of motion; some spasticity at times.

Eyes, nothing abnormal noted except exophthalmos of right eye.

Nose, discharge from right side, purulent tinged with blood; tumor mass noted in right side of nose, quite extensive.

Autopsy: Old blood in right antrum. Upon opening the roof of the orbit on the right side there was found normal orbital fat; but on removing the base found antrum filled with grayish brown and old hemorrhagic mass. In frontal sinus and ex-



Fig. 7. Case VII—Tumor of the fourth ventricle.

tending into orbit and occupying base was found a tumor which could be removed only with difficulty and in fragments. Microscopic examination of brain substance around the cerebral hemorrhage show pigmentation marked about site of hemorrhage with atrophy of cellular elements. Basal ganglia pushed over. Ventricle on right side partially collapsed; no tumor. Large clot bigger than egg in right parietal region and posterior to posterior fontanelle; consistency of brain around clot very soft. Basilar vessels normal.

Case VII. The specimen of tumor of the 4th ventricle was loaned me by the Hendrick Laboratory (of Dr. F. C. E. Mattison). W. H. Age 20. In August, 1906, he complained of some pain in his jaws. September 22nd he had paralysis of right side of face. Early in October he commenced to have difficulty with his right eye and general diplopia. Some numbness and tingling in left arm and leg. Dizzy most of the time, nausea almost continuously. A tentative diagnosis of gumma in the floor of the 4th ventricle was made, and he was put upon iodide of potassium together with mercury.

Died March 26, 1907. Autopsy by Dr. Black showed glioma on the floor of the 4th ventricle to the right of median line, size of walnut.

I wish to express my thanks to Dr. Mattison for his permission to use this case.

In conclusion I desire to express my obligation and thanks to Dr. Black for the specimens from the Hendrick Laboratory and to Miss Tucker, Secretary, and Miss Bettin, of the 3rd-year class in the Los Angeles Dept. of Medicine, University of California, for their help in assembling the specimens and histories.

THE INDICATIONS, TECHNIC AND RESULTS IN DECOMPRESSIVE OPERATIONS ON THE BRAIN.*

By WALLACE L. TERRY, M. D., San Francisco.

The idea of trephining the skull for the relief of increased intracranial pressure is an old one—indeed it is possible that the crude openings in the skulls of some prehistoric individuals were made for the purpose of relieving persistent headache due to tumor. The credit of advocating decompressive trephining for tumors of the brain which were not removable or could not be located is due to Horsley, although others had previously reported cases where such operations had been done. It was not, however, until Harvey Cushing, basing his ideas largely upon his experimental work on cerebral compression, emphasized the value of decompression and made great improvements in the technic of the operation, that the procedure became well known and quite generally adopted.

When we consider that the adult brain is enclosed in a rigid bony cavity, it is readily understood that any neoplasm encroaching on this cavity does so at the expense of the blood, the cerebral fluid or the brain tissues normally occupying it. Within certain limits, the blood and cerebro-spinal fluid accommodate themselves to the increased intracranial pressure and the patient may present no symptoms of brain tumor. When, however, the tumor is larger or produces irritative symptoms with an increase of fluid or blood in the cranial cavity, the patient will then manifest the usual symptoms of increased intracranial tension, such as headache, vomiting and eye changes. It has been said that the diagnosis of a brain tumor is comparatively simple, but the localization of it is oftentimes a difficult or impossible matter. It is in just such cases where a tumor cannot be located or where, because of its size or location, it cannot be removed that a decompressive operation is indicated. By giving the brain a chance to expand the symptoms are ameliorated or even cured. Most important of all, the eye changes, beginning with choked disc and ending with optic nerve atrophy, may be stopped. It is a well recognized fact that the atrophied optic nerve does not regenerate and that often when atrophy has begun it progresses, despite the relief of pressure. Choked disc, however, can usually be improved and impending blindness prevented by decompression. Horsley says: "In no case of optic neuritis (not, of course, of toxic or anemic origin) should the process be allowed to continue after it has once been diagnosed, and if blindness results therefrom the responsibility is very heavy on any one who fails to advise such a simple procedure as opening the dura mater."

Occasionally we see instances of natural decompression; in the young, by the separation of the sutures, and in other cases where a tumor mass has grown through the skull and permitted expansion of the cranial contents. Two instances of the latter form have come under my personal observation—both being sarcomas springing from the dura mater in the upper occipital region. One patient was re-

* Read at the Forty-first Annual Meeting of the State Society, Santa Barbara, April, 1911.

ferred to me by Dr. S. T. Pope with the history that he had noticed a mass on the back of his head about ten years previously. He complained of headache, dizziness and diminished vision which proved to be from a hemianopsia. At operation two years ago it was found that a dural sarcoma had perforated the skull. A considerable area of skull and most of the tumor was removed and the remainder of the tumor treated with the Roentgen ray, injections of Coley's fluid, and acetone, with the result that the headaches and dizziness disappeared and the field of vision became considerably increased. The second case showed headache, vertigo and marked optic atrophy at the time he came into my service at the San Francisco City and County Hospital and a similar operation a month ago has given much relief, but, of course, the blindness persists.

In some cases of cerebral tumor, compression has been relieved by the withdrawal of fluid by spinal puncture, but as this procedure is so dangerous in such cases it should never be done. There are numerous cases on record of sudden death after spinal puncture with withdrawal of considerable fluid, due to crowding of the medulla and the walls of the fourth ventricle into the foramen magnum. For diagnostic purposes the pressure of the spinal fluid can be determined by suitable apparatus without losing more than a few drops of fluid and part of this can be used for chemical and microscopical examination. Krause records a case of brain tumor in which after removing only 2 cc. of spinal fluid the patient immediately vomited, went into collapse and remained unconscious for a number of hours.

It is an unfortunate thing that the diagnosis of brain tumor is so often followed by the prolonged administration of antileptic remedies, with the result that valuable time is lost. It is a far better plan to first relieve the pressure and then to medicate, than the reverse. The Wasserman and other similar tests for lues are almost certain diagnostic measures, and for one to push the iodides and mercury in suspected brain gumma with a negative Wassermann is wrong. Horsley is strongly of the opinion that these gummata are not cured by such treatment and that they should be removed if possible. Whether the new arsenical preparations will accomplish the results remains to be seen.

Cushing has employed subtemporal decompression as a preliminary step in the removal of tumors in some cases. In one instance he bared the anterior half of the left hemisphere and finding the dura very tight, he did a left subtemporal decompression and closed the first bone flap. Five days later, as the pressure was not sufficiently relieved, he did a right subtemporal decompression and again after five days he reflected his original bone flap and successfully removed a prefrontal tumor without subjecting the brain to the dangers incident to a marked degree of protrusion.

Cushing has also applied the principle of decompression to cases of cerebral hemorrhage in the newborn, basal fractures of the skull, epilepsy and headaches of the migraine type. He has achieved some splendid results in cerebral hemorrhages in the newborn—those cases which result in Little's disease. About half of his patients recovered. I have

had but one such case, referred to me by Drs. Spaulding and Moffitt, upon which I operated in 1905 with a fatal termination due to shock.

In basal fractures of the skull, Cushing has made decompression with drainage a routine procedure at Johns Hopkins Hospital. In these cases it is difficult to generalize, for the brain injury is often so severe that the patients will die despite any treatment and in others recovery will ensue with practically no treatment. My own experience in basal fractures has been fairly large and while I believe that decompression with drainage is a rational procedure, I have been disappointed with the results I have obtained from it. It is not alone that the decompression aims to relieve the pressure from hemorrhage at the base but it is also for the purpose of minimizing the disastrous effects of edema of the brain and its membranes which rapidly follows trauma. Decompression for epilepsy is indicated only when we have evidence of abnormal tension, the cause of which is obscure or cannot be removed. As regards decompression for headaches, I quote from Cushing: "There are many types, of course, of hemicrania and many causes for it, but in one familiar group there occurs during the attack a marked arterial dilatation of the temporal vessels, accompanied by a venous congestion which is seen best in the external branches of the ophthalmic vein, but which is observable, too, by the ophthalmoscope in the eye grounds. Ptosis, pupillary inequality, vomiting, slow pulse and other familiar symptoms, associated at times with a low grade of choked disc, accompany the attacks, and a number of these individuals have submitted with eager willingness to the experiment of a subtemporal decompression, which has resulted in a considerable measure of relief in most of them." Cushing states, however, "that the matter demands much longer study before it can be advocated on a sound basis of therapy," but it seems like a step in the right direction.

As regards the seat of decompression, Horsley first advocated making it over the suspected area but he now employs the subtemporal route in those cases of tumor which cannot be safely removed or in which localization is impossible. If the pressure is subtentorial, then of course the decompression should be in the occipital region.

The credit for originating the subtemporal and the suboccipital decompressive operations belongs to Cushing and as they possess such manifest advantages over the other types of operation, the technic of them will be briefly considered. The major principle involved in Cushing's operations is the restraint of the cerebral or cerebellar hernia by aponeurotic and muscular tissue. Where the hernia is covered only by the scalp, the growth of the tumor may lead to a rupture of the scalp with the development of a fungus cerebri and death from infection. The temporal muscle and fascia on the one hand and the suboccipital muscles on the other are, if properly united, sufficiently strong to prevent such an occurrence. Another advantage of the subtemporal route is that the herniated portion of brain is over a silent area and neither paralyses nor aphasia are the direct results of the decompression.

For the subtemporal decompression a curved in-

cision through the scalp is made along the temporal ridge, the flap turned down, and the fascia and muscle split in the direction of their fibers. In decompression for basal fractures the scalp incision can be made obliquely backwards parallel to the fibers of the posterior portion of the temporal muscle. The periosteum should be scraped back and the underlying skull removed for an area of two by three or four inches without disturbing the temporal ridge, the origin of the muscle. The dura should then be opened and a portion of it excised, care being exercised with regard to the meningeal vessels. The temporal muscle, fascia and scalp should now be carefully sutured in layers without drainage. The right temporal region is the area of choice in right handed persons, but if sufficient decompression is not obtained, the opposite side should be similarly treated.

For the exposure of the suboccipital region, a crossbow incision is usually made—a curved, transverse incision just below the origin of the superficial muscles, the trapezius and complexus, joined by a vertical in the median line of the neck. After dividing these muscles about an inch below their origin, and the ligamentum nuchae in the median line the occipital bone is exposed by scraping away the periosteum and the attached deeper muscles. The bone is then removed with a rongeur, beginning at either side, for the hemorrhage from the diploe is apt to be embarrassing as the median line is approached. For the control of the emissary veins Cushing employs dry absorbent cotton which promotes coagulation. The occipital bone can be removed if necessary as far as the foramen magnum. The dura should then be incised on either side of the occipital sinus and the sinus divided between ligatures as advocated by Frazier. A considerable portion of the dura should be excised to permit herniation of the cerebellum. The operation is completed by careful approximation of the muscles, aponeurosis and scalp.

THE SURGICAL TREATMENT OF SUB-TENTORIAL CYSTS AND TUMORS.*

By ANDREW STEWART LOBINGIER, M. D., Los Angeles.

It may be said with a large element of truth that the diagnosis of intracranial growths is now based upon data which formerly was either overlooked or failed of proper interpretation. In this respect there has been quite as great advance as in the appreciation of the early and classic evidences of gall stones or of gastric ulcer. There was a time in the very near past when these pathologic conditions were known only as their terminal complexes made them evident.

If we are to accomplish anything vital in the surgery of the brain it must come through the earliest possible recognition of intracranial lesions. This can only be realized by discarding an ancient and misleading symptomatology and in its place establishing proven and dependable evidences of the very beginning of pathologic change. We have had illuminating examples in recent reports of what

some of these now well established evidences of intracranial tension are; they have always existed and have only waited an intelligent reading of their significant meaning.

May we not hope that soon we shall have done with mistaking cysts for hysteria, gliomas for neurasthenia; and neuro-retinal edema as significant chiefly of nephritis? The causes of intracranial tension are not so few nor so rare that we should stubbornly persist in finding extraneous causes for the real and palpable symptom complex.

If inspiration may come from the Queen's Square, Augusta and Johns Hopkins clinics, the brilliant work of Horsley, Krause and Cushing should encourage those interested in this field of surgery to work the more earnestly, that those upon whom the burden of diagnosis shall fall will read these melancholy signs early and accurately. A papillœdema allowed to pass unrelieved beyond De Schweinitz's fifth class into a hopeless optic neuritis, Horsley calls a crime. A tumor allowed to grow for years at the expense of a large, active area of the brain, without detection until inoperable and beyond relief is equally a grave reflection. One is continually amazed at the elaborate effort exerted to class these cases in some other—any other, category than brain tumor. Why is this true? The encephalon is not *terra incognita* to many who have given this field studious attention. It is true as Cushing says, (*Lancet*, Jan. 8, 1910) that "intracranial surgery from a technical standpoint is unlike all other forms of surgery in that the delicate structures involved cannot be handled with sponge and clamp and ligature as can the tissue of the body with which the surgeon is more familiar. It is far easier to do harm than good by the rough and rapid operative measures so commonly employed.

"Familiarity with special methods of manipulating a brain under tension, of controlling hemorrhage from the cerebral substance without insult to the tissues, of avoiding injury to the pia-arachnoid until actual extirpation is attempted are essential to success in the work."

It frequently happens that a diagnosis is made only after years have elapsed through which the tumor may not only have caused irreclaimable destruction of the auditory nerve and the retina but grown to such a size or into such a vital area that its removal is impossible, as the following case illustrates:

Wm. F. S. Age 30 years. Born in Minnesota. Was quite normal up to Nov., 1908, when he began to notice the beginning of his present trouble. It began by loss of appetite followed later by vomiting, chiefly after meals and in the morning. He developed a peculiar prickling pain in the occiput which seemed aggravated upon rising from bed or suddenly changing his position. If he remained quiet it did not trouble him. His gait began to incline to the left. Because his nausea and vomiting steadily grew worse it was thought he had a malignant ulcer of the stomach. He consulted celebrated gastrologists and surgeons in the west and after a thorough examination he was sent home with a diagnosis of "general debility." In the latter part of February, 1909, he first noticed failing vision. In March, 1909, he and his family came to California. The headache and vomiting continued

* Read at the Forty-first Annual Meeting of the State Society, Santa Barbara, April, 1911.

in an aggravated form and he developed diplopia. His gait was staggering, he frequently stumbled necessitating his using a cane and he had some trouble swallowing. In April he first observed tremor in his left arm. There were times when his nausea and headache were diminished. When looking quietly to the side he would suddenly become dizzy even while sitting. Since April a gradually increasing deafness in the left ear was noticed. His left knee gives way if he attempts to stand on his left foot and he has cephalic inclination to the left.

Drs. Wehrley and Orbison, through whose courtesy I was permitted to see this patient, suspecting cerebellar tumor had repeatedly urged him to have it enquired into surgically. When the patient finally came to me September 11, 1910, he had nausea, headache, partial blindness, absolute deafness in the left ear, staggering gait, an atypical nystagmus and examination of the fundus by Dr. Montgomery revealed a bilateral papilloedema more intense on the left and dyschromatopsia. It did not require further data to arrive at a diagnosis of tumor pressing on the acousticus and at operation done on the 14th day of September, 1910, a deeply lying growth of ovoid form, 4 centimeters by 2½ centimeters in dimension with several cysts the size of small nuts grouped about it, was found lying within the left lobe of the cerebellum impinging on the left auditory at the pontine angle and extending for a centimeter and a half bordering on the pons and medulla. On two attempts to lift the growth from its attachment the respiratory center was so disturbed that respiration ceased,—on the second attempt only to recover after a long interval and artificial measures to restore the equilibrium of the center had been used. Unwilling to make further attempt to enucleate the tumor at the time the wound was closed. The patient lived nine hours after the operation.

Apart from the importance of posture of the patient and the choice of anesthetic, the approach to the cerebellum is attended with sufficient difficulties to justify the consideration of some of the more important features. Whether we elect to employ the quadrilateral flap of Krause or the cross-bow incision of Cushing, hemorrhage from the soft parts and from those emissary veins lying posterior to the mastoid cells is a problem of first importance. It not infrequently happens that an emissary vein may require plugging with a sterile basswood cone before the flow can be controlled. This will usually be necessary in veins over four m. m. in diameter. The smaller ones may often be controlled by crushing in the periphery of the opening in the external table with a blunt instrument devised for the purpose. Control of hemorrhage from the soft parts covering the occiput would be a very simple procedure were it possible to use the tourniquet here as in operations on the cerebrum. It is necessary therefore to proceed in the uncovering of the cerebellar region with such care and deliberateness as will insure a minimum loss of blood; and any one who has had a measurable experience in cerebellar operations will not fail to accord exceptional care to hemastasis.

If the subtentorial space has been under tension for any considerable time the skull may be thinned down to a millimeter in thickness. The greatest caution should be used to avoid opening into the subpial space in cutting through the thin table. One rarely encounters sufficient hemorrhage from the hardened and thinned diploe requiring the bone wax. Only when well toward the mastoid cells or

above the lateral sinuses or near the foramen magnum may diploe oozing be annoying and it is easily controlled by Horsley's wax.

One of the most valuable suggestions in exposure of the cerebellum is that of Cushing wherein the dura instead of being opened first beneath the transverse sinus causing immediate and embarrassing extrusion of the lobe under tension, is incised low down next the foramen magnum. This quickly drains off the spinal subtentorial fluid, relieves the tension, avoids herniation and bleeding from the exposed lobe or crowding downward of the medulla into the spinal canal. The cerebellum sinks back into place allowing a clearer field for work and the shock of depression arising from sudden change of pressure is averted.

Duret called attention years ago to the fact that there was a great difference in the various portions of the brain as to the degree of shock attending its manipulation. Horsley believes it "obvious that inasmuch as the nerve centers of organic representation are situated in the posterior fossa of the skull opening of this region might theoretically be expected to cause more shock symptoms than the opening of other parts." Horsley's statistics show two and a half times the mortality in operations on the cerebellum as compared with motor area of the cerebrum. (Toronto address, July, 1906.)

His tabulation shows a ratio of:—

Motor area	1 death in 27 operations
Parietal post parietal region	1 death in 19 operations
Frontal region	1 death in 13 operations
Temporal region	1 death in 12 operations
Cerebellar region	1 death in 10 operations

Harvey Cushing in his Liverpool address (*Lancet*, Jan. 8, 1910), reports 35 operations on the cerebellum up to that time with 4 deaths, one from post operative pneumonia, which he believed induced by faulty posture; a second from hemorrhage from a tumor of highly vascular nature arising from the region of the corpora quadrigemina; a third from *status lymphaticus*, and a fourth from an effort at the first sitting to enucleate a portion of the wall of a very extensive gliomatous cyst. "In fourteen out of thirty-five suboccipital operations the tumor was not found and the procedure was abandoned as a simple decompression with the usual degree of palliation."

Cushing sums up: "In this group of 35 cerebellar operations there have been 4 operative fatalities (11.4%), thirteen successful extirpations or cyst evacuations (37.1%), fourteen operations abandoned or decompressions (40%) with complete abeyance of symptoms in many instances and two cases (5.7%) in which practically no betterment occurred. In view of the fact that cerebellar tumors are regarded by many as particularly unfavorable for operation these figures are encouraging and we may hope for a still better showing in the future when surgical treatment will be instituted at an earlier period of the disease. Even with our recent improvement in this respect the fact that 12 of these 35 patients were blind or nearly so at the time of operation shows how dilatory we still are in these matters."

The statistics and observations of Sir Victor Horsley on subtentorial operations and the fact that Cushing found it impossible to proceed beyond a decompression and cautious exploration in 14 out of 35 cases, obviously confirms a well grounded respect amongst surgeons for this region. The proximity to the bulb and the suddenly disturbed and readjusted intracranial tension after long residence of a cyst or tumor near the tract of organic representation, are in themselves sufficient to account for this care and patient conservatism in surgical manipulations in this field.

There is a class of cases which often affords great doubt as to a definite anatomic localization. These growths may be either solid or cystic; it is their situation which may give rise to considerable confusion. As a rule their position may be best determined by a process of exclusion in which the lateral recess, the vermis and bulb may be consecutively considered.

Cysts of the cerebellum may be pial or parenchymatous. The latter are not infrequently, if of long standing, the residuum of substantive hemorrhages or degenerated gliomata. They are as often found in the lateral recess and impinging on the bulb as within the lobes of the cerebellum. I have several times found them associated with solid tumors. They may be so deep seated as to be impalpable even by the most careful exploration. A case recently under observation of the writer is one in point:

The patient, a young man of thirty, first became ill six years ago. After a succession of colds he was sent to a ranch for nine months; he was greatly improved and returned to work. A year previous to his giving up his work he had vomiting attacks. His digestion was thought at fault and chronic adhesive appendicitis occasioned the removal of his appendix. The benefit was but transient and later he went to a celebrated clinic in the west, where no organic lesion could be found and he was pronounced a "cheerful neurasthenic" and advised to "return home and as far as possible live out of doors." The retina was not examined at this time. On his return his discs were examined, showing papilloedema, which together with vomiting, headache and uncertain gait, led to the recommendation of decompressive operation. Somewhat later this was abandoned because of an apparent improvement in the retina. Later his symptoms grew more aggravated. A Moro test for tuberculosis proved positive. Under the exhibition of tuberculin his nausea and vomiting made considerable improvement. Five months ago when through the courtesy of Dr. Cole and Dr. Thorpe he came under my care for surgical relief, his symptoms had again become aggravated. Nausea still persisted, his vision was decidedly impaired and occipital headaches constant, with papilloedema more intense in the left disc. Palpation showed the left occiput slightly more sensitive. Nystagmus if ever present was not constant. There was no interlacing of the color fields.

Exposure of the cerebellum showed thinning of the skull to a millimeter over the left lobe; a trifle thicker over the right. Pulsation was practically nil over the left lobe. On opening the dura and exploring both lobes and the lateral recesses neither cyst nor tumor could be discovered. Nevertheless the left lobe was soft and extended more than a centimeter through the cranial window. A few days after the operation the headache and nausea were relieved, but a week later it was apparent that the left lobe was again under plus tension, and a fortnight later it discharged fluid freely into the dressing. From the depth of the cavity and the amount

of gauze required to pack it, it was evident that a cyst of considerable size had been evacuated. Since the operation the papilloedema has practically cleared up and the nausea and headache had, until within a few weeks, greatly improved. A later observation shows the cyst to be refilling with aggravation of the headache, nausea, and uncertain gait. The patient has consented to a secondary and radical operation to be done in the near future.*

This case shows the disappointment which may result even when a very ample exposure and double decompressive procedure are undertaken, where the growth is too deep-seated to be reached by finger or spatula exploration and where the manipulations were carried to the very border of a lethal issue. Cases of this sort and tumors too deeply complicated with the bulb for primary exploration fall readily in the category of those for which Horsley's two stage procedure is indicated. We may well quote Cushing's axiomatic doctrine here—that "safety is more essential than haste." There are conditions involving the retina and the nutrition of the patient which make it imperative that the intracranial tension causing the optic neuritis, vomiting and depressing headache be relieved with the greatest promptitude. In such cases a decompressive measure is distinctly remedial; and if the effective and radical extirpation of the growth cannot be done with safety at this first intervention it should properly be deferred until conditions are more favorable. It will frequently be found that the tumor or cyst will present most conveniently at the second exposure and may be easily extracted or packed out.

The reports in later years emanating from authoritative workers in intracranial surgery are decidedly encouraging and should inspire a definite and persistent effort and purpose amongst those of us interested in this field of surgery, to do more careful and painstaking work. We should encourage by every influence we may exert an early and precise recognition of the evidences of organic intracranial tension; and in this connection the minutest changes in the retina should be observed from the very beginning.

We cannot close with more fitting words than those of Harvey Cushing: "Earlier diagnosis and more prompt interference, a wider experience in overcoming the technical difficulties of these cases coupled with the courage to work slowly and painstakingly,—these things will lead to increasingly better results in this responsible work, the success of which depends so greatly upon detail, patience and the expenditure of time."

Discussion.

Dr. H. G. Brainerd, Los Angeles: I want to add a word in regard to the difficulty of diagnosis in these cases. The clearing up of the diagnosis in the last ten years has come almost entirely through the study of the eye, so far as I know. I wish to refer to the case twice mentioned this morning by Dr. Lobingier. This man was under my observation for ten years or more and the first trouble which he experienced was after prolonged work with his eyes, when he developed neurasthenic symptoms. He was relieved of these symptoms by a rest upon a ranch, and was able to resume his work as bookkeeper for two and

* Since the above was written I removed a cyst containing an ounce of clear fluid from the center of the left lobe. The patient has made a good recovery.

a half years with brief vacations without real loss of time. Then he began to develop (this was five or six years ago) morning vomiting. After this he was lost sight of for a while. The next I heard was that he had had an appendectomy and was relieved of his symptoms. He got well and went to work again. Later, when visiting his family, I heard of him again—that he had been greatly benefited by taking atoxyl, and up to the time that I saw him—about six weeks before the operation—he had developed no cerebellar symptoms whatever, unless it was the vomiting. In the meantime he had worked again and then got worse and went East to a noted clinic, where he had been told that he was a neurasthenic. After he came home he had a course of tuberculin, which benefited him and relieved the symptoms. When I last saw him there were distinct cerebellar symptoms and I thought he had intracranial pressure but did not know where to locate the lesion. The symptoms had been shifting and part of the time were certainly neurasthenic. This all goes to show the difficulty of diagnosis. There was another, the case of melanotic sarcoma presented by Dr. Orbison. I saw the man just before he was operated upon and death occurred. He was a working man who had been digging a well, when another workman let drop a bar on his head, which had cut the scalp somewhat, requiring a few stitches. He had walked home a distance of a couple of miles and had gone to bed with increasing headache. Four weeks after that he was comatose with a history of steadily increasing stupor. His wife said he had always been well and strong and had had no injury or illness up to the time of the blow on the head. At operation we expected to find a hematoma, but instead of that exposed a melanotic sarcoma, and then for the first time learned the history of the removal of a sarcomatous testicle a few months prior. There is a point of importance in dealing with these cases surgically, and that is the danger of anesthetic—ether especially—in cases of cerebral growth. I have seen two cases that died of the anesthetic before the surgeon touched them and two other cases die as a result of the anesthetic immediately after operation.

Dr. Cullen Welty, San Francisco: In the diagnosis of cerebellar tumors there seems to be a great deal of confusion. Of all the men that have so far spoken, not one has grouped a certain lot of symptoms that are present in all cases, namely, deafness, vertigo and nystagmus. Before proceeding further, what other lesions might produce such symptoms? They are comparatively few and can be differentiated very easily. Acute Meniere's disease, fracture of the bone through the fibrous portion of the temporal bone, acute or chronic suppuration of the labyrinth. To return and analyze deafness, vertigo and nystagmus, it is quite essential that the examiner understand in detail the use of the tuning forks. We have two great forms of deafness that can be very easily differentiated. We have another form of common deafness (adhesive process) that is again easily differentiated from the other two forms. In the two forms of organic deafness, the ears are practically the same, there will be so little difference that a marked deviation from this established finding will attract your attention at once. So when you have a decided change, you must look carefully for other symptoms which you will be able to find. It is strange, however it is true, that the great majority of adhesive processes affect both ears equally. However, this is not to be relied upon so absolutely as in the other two forms of deafness—nevertheless they are usually about the same, at the same time an adhesive deafness is amenable to treatment and the organic forms are not. Again, the adhesive form reaches the same degree of marked deafness. With the simple analysis of deafness you can readily see that you are well on your way to a correct diagnosis. The other conditions that might be confusing at this place are as follows: Meniere's disease, fracture of the base through patulous portion

of temporal bone, acoustics tumor, and purulent, non-purulent affection of the labyrinth. As you can readily see it will be comparatively easy to study your case and make a diagnosis with the associated history. I started out calling particular attention to the associated symptoms: deafness, vertigo and nystagmus. It must be remembered that vertigo and nystagmus are always associated; at the same time you can have a physiological nystagmus. However, such nystagmus will be equal to the right or left, in contradistinction to an induced nystagmus, that will be more in one direction than another. Sometimes this is hard to determine; an instrument called by the name of an astigmatometer will measure accurately this difference in degree. As to the form of nystagmus—horizontal, rotary or vertical is immaterial. It will be found that sometimes the nystagmus is to the right, left or horizontal. This is dependent on the location of the lesion or to the canal most involved. At the same time the position of the head will change the nystagmus,—this is dependent upon the position of the canal in relation to the head. Again, the new growth may be so situated as to cut off communication from Deiter's area, and you have a nystagmus from an overbalance of the canals. This can be proven or disproven by the caloric reaction. Deafness, vertigo and nystagmus can be produced by an acute or chronic suppurative pressure. The differential diagnosis between cerebellar tumor and semicircular canal is made easy by the fact that the cerebellar cases will fall in any direction, while those with a lesion of the semicircular canal will fall in a certain definite direction that is dependent upon the position of the head and the semicircular canal involved. The differential diagnosis between cerebellar tumor and cerebellar abscess following labyrinth operation, where the nystagmus has been to the opposite side and returns to the same side is proof positive of a cerebellar abscess. Equilibrium disturbances are quite characteristic and when studied in detail will produce positive and negative conditions that go far in further confirming the diagnosis. Only a few months ago Dr. Lennon of San Francisco reported five cerebellum cases studied in detail. In each and every one of these cases the findings of deafness, vertigo and nystagmus were quite apparent. In fact, the doctor called attention to the associated symptoms. Nystagmus and vertigo have been very carefully studied recently by Barany of Vienna, and it is to him that we are indebted for these valuable aids in diagnosis. Where you have such definite findings the diagnosis should not be so confusing as some of the speakers would lead us to believe.

Dr. Mark Emerson, Oakland: Both these papers have been very interesting and instructive to me. Dr. Terry made no special reference to lymphatic drainage; perhaps it was not necessary, as that should be inferred. Yet I feel that some emphasis should be placed upon this feature. The lymphatics are more active than we give them credit for. The lymphatic edema which sometimes follows the radical operation for removal of the breast gives us an idea of what interfering with their drainage will do. Of the hundreds of inches of brain surface under tension, with intracranial troubles, the removal of a small piece of bone will do very little good if there is no permanent lymphatic communication established. Lymph spaces surround the dural blood vessels, and the degree of communication of these peri-vascular intracranial lymph channels with the outer lymphatic system will determine the permanency of your results, especially in internal hydrocephalus and other lesions where pressure symptoms are manifest. Instead of removing a round piece of dura as advised by the essayist, if a stellate piece is elevated and reflected over the knife-like edge of the thin temporal bone and tucked or sutured beneath the periosteum, we eliminate that annoying feature of clot or oozing from the injured delicate pia vessels forced out with the small or large hernia that follows, for the blood clot undergoes further degeneration, which prevents com-

munication, which is the important thing in this class of work.

Dr. W. I. Terry, San Francisco: In regard to the position during operation on the cerebellum, the elevated position of Krause would be good except for the manual difficulties of getting at the base of the brain, because considerable control of hemorrhage can be obtained by posture. Dr. Brainerd spoke of ether as being dangerous in these cases. That is true if you do not have a skilled anesthetist. Where you have a skilled anesthetist who devotes himself preferably to anesthesia, you do not need to fear that. Where the anesthetic is given without due regard to the patient's condition and where a large amount of anesthetic is given and the patient struggles, I think it makes a big difference. I am glad Dr. Welty spoke of the ear disturbances. They are very important. Dr. Emerson spoke about the decompression. There are cases on record of long standing cures and even some where the tumor entirely disappeared following a simple decompression. I had one man, a cerebellar case with a large tumor I could not remove in the cerebello-pontile angle. The man is still alive after four years with a hernia of the cerebellum. He was blind before I operated on him and still is. I do not agree that decompression is an unnecessary measure. The establishment of lymph drainage is probably important but I do not think turning the dura mater over the edges of the base is going to accomplish that alone. The dura mater should be removed in a decompression and certainly your lymph channels will be established between the brain and the muscle.

Dr. A. S. Lobingier, Los Angeles: Cushing in his Liverpool address described his experimental production of papilloedema by pure mechanical pressure on the brain itself; pressure was made over the dura at the time of operation and observations of the retina made at the time. It is his firm belief that papilloedema is a distinct pressure edema. The development of a true retinitis is a later substantive change.

Hysteria and disturbances referable to certain functional nervous conditions, gastric ulcer and many other conditions, have been constantly confused with intra-cranial tension, and I wish to draw your attention to the relation between the disturbances of the stomach and the retinal findings. One hears extended reports made in the examination of these cases in which the retina has almost entirely been ignored. If the contributors to this symposium have succeeded in giving sufficient emphasis to the necessity of observing the retina constantly in every suspected brain lesion, these discussions this morning will not have been in vain. Dr. Orbison called attention to early diagnosis. I think the specimens he showed were illuminating illustrations of what might have been done were an early diagnosis made. With regard to the question of posture brought up by a speaker, the semi-sitting position was first suggested by Horsley; Krause adopted this because he felt with Horsley that it produced anemia of the brain and much loss of blood would be thus spared. There is no question that in the ordinary brain operation the semi-sitting posture has its advantages. In the subtentorial cases it is obviously not advantageous. I think Cushing's posture in subtentorial operations is decidedly to be preferred. Of course Cushing elevates the shoulders. Horsley has emphasized in all his lectures the necessity of using chloroform instead of ether but it must be remembered he measures it accurately by the Vernon Harcourt apparatus, and has oxygen at hand to be used when the blood darkens. We have already alluded to the danger of spinal puncture. Dr. Terry referred to Horsley's new operation in respect to gumma. I do not believe any man is better able to speak on that subject than Sir Victor. There is a material advantage he thinks in relieving the intracranial tension before anti-syphilitic treatment is undertaken. Cushing has advocated an admirable technic in subtentorial exposures whereby a large covering

of fascia and muscles is preserved. I have a number of times found advantage in this protection where a large amount of bone was necessary to be removed.

I think Dr. Welty has scarcely heard all that has been said in respect to the necessity of examining the ear carefully in subtentorial growths. I no more think of making a diagnosis in these cases without having the ear gone carefully over than I do of not having the eye examined. I mentioned nystagmus and vertigo and think they have a very close relation to the ear itself and also to any growth or tension in the subtentorial region.

FUNCTIONAL INSUFFICIENCIES OF THE MYOCARDIUM.*

By H. D'ARCY POWER, M. D., San Francisco.

I have not chosen the subject of this paper on account of any new light I can shed upon an old story nor have I any extensive series of cases to record but, because in the daily run of general practice, the victims of the condition I am to deal with, are numerous and constitute an important element of our clientele. Yet, nevertheless, their symptoms are too often misinterpreted; sometimes, perhaps, unavoidably so. By relative functional insufficiencies of the myocardium, I refer to all those cases in which the heart is unable to perform its normal work, within reasonable limits of strain, without subjecting its owner to discomfort or distress, and in which there is no ground to affirm gross or microscopic changes in its structure. This last statement is not intended to cover temporary alterations of form or position. Nor is it proper to include theirin conditions of pain or discomfort without manifest insufficiency. It is needless to thresh over the question as to whether functional insufficiency can exist without a morphological basis. It is safe to affirm that structure is as dependent on integrity of function as the reverse.

In our daily practice, we meet with two distinct classes of cardiac affections. First, organic lesions manifesting the well known indications of valvular defects, myocardial degeneration and change. These conditions may be compensated or latent, but they do not admit of a *restitutio ad integrum*, and they are at all times possible of recognition. Secondly, the cardiac neuroses, that under many names, and with a varied symptomatology, are, for the most part, reflex manifestations of disease elsewhere. Precordial pain, false anginas, tachycardias, and bradycardias, arrhythmia, and vaso-motor ataxias, constitute a numerous and increasing class of ailments that can exist transiently, or some times permanently without either clinical signs or organic change in the heart. There is a third group in which physical examination either fails to reveal myocardial change, or such alterations of form or action as may from time to time occur, are variable or impermanent, and not discoverable post mortem. Nevertheless these patients manifest symptoms that are only explicable on the assumption that the heart is, at the time of their occurrence, unable to adequately perform its functions. Thus we have individuals in whom all exertion is ac-

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complished or followed by dyspnea, possibly by tachycardia, and precordial oppression. Yet others in whom these symptoms supervene on physical disturbance or secondary to the vascular strains incident to digestion and other physiological processes. Such manifestations of failure may even lead to temporary dilatation with visceral congestion and edema, all of which may eventually pass away without obvious permanent effect. And, finally, a most important group of cases in which, without any pre-existing cardiac affection, the insufficiency accompanies, and seemingly has its origin in an increase of body weight over and above the physiological requirements. In all these forms symptom complexes occur that do not materially differ from those of organic insufficiency, and thus prognostic errors are of frequent occurrence.

The symptoms may be shortly enumerated as follows: Dyspnea on, and sometimes without, exertion. Tachycardia, occasionally bradycardia. Precordial pain. Dizzy sensations, or full vertigo, especially on sudden rising. Coldness of the extremities, with venous congestion. Sense of bodily oppression, and mental depression. General muscular weakness. Distressing pulsation of the arteries. To these must often be added the physical evidence of temporary dilatation of the heart. These symptoms vary in their incidence and grouping in accordance with the underlying causes of the insufficiency and its immediate pathogenesis. An analysis of the proximate factors will show:

First—A congenitally defective cardiac reserve.

Secondly—Insufficiency of musculature for normal work.

Thirdly—Toxic depression of the myocardium.

Fourthly—Abnormal demand on a normal musculature.

Fifthly—Mechanical interferences with cardiovascular relations. The recognition of these factors is of prime importance both from the standpoint of treatment and prognosis.

Group I. Congenitally Defective Reserve.—We must recognize a group of individuals whose cardiac reserve is congenitally defective. As children they are unable to run as well as their fellows. Later in life, under the strain of physical training, or of their occupation, they show the same inability to meet requirements that are readily borne by their fellows.

The heart works under somewhat different conditions to other organs. While like them it possesses the power of doing a much greater amount of work in a given time than it is regularly called upon to perform, yet its individual contractions are maximal, and bear the disadvantages that attend muscle work under such circumstances. Thus the amount of work accomplished by a muscle increases with the work (or load) put on it, up to a certain point, and then rapidly decreases. In the heart this point is already attained, therefore fatigue is more readily evoked. When a heart is worked beyond its normal capacity it usually increases in power and mass; whether this entails a diminution

of its ratio of reserve is not decided, but there is much reason to believe that it does. The class of patients under consideration may pass the ordinary conditions of life with no evidence of their deficiency, though it readily becomes manifest under strain. Nor is it necessary in such cases to posit hypoplastic or abiotrophic conditions. The muscle cell varies in its potential energy apart from the question of mass as is seen in the difference between its varying contractile power in different animals.

Group II. Muscular Insufficiency for Required Work.—This may occur in two very different ways: (a) Excessive activity of other muscles; (b) excessive weight of the body leading to vaso-motor strain. The first group is well known under the heading of primary heart strain. Excessive muscular work has resulted in such an increase of peripheral resistance that the muscle fibres elongate, a condition that is more difficult to recover from the longer the period thereof, in accordance with the well known law of muscle fatigue. The second condition is, in the opinion of the writer, the most prolific of all causes of relative cardiac failure. There is for every individual a normal physiological body weight, though this is not invariably the figure given in tables of height-weight ratio; when this physiological weight is exceeded, the entire organism is put at a disadvantage and no part thereof more specifically than the myocardium. It is worth while to consider this a little in detail. Height is determined by the size of the skeleton; weight by the size of the organs, the mass of the muscles, and the amount of panicle necessary to protect from loss of body heat. The mass of the organs are subject to inconsiderable variations. The muscle weight is probably never unphysiological, it is measured by its utility and promptly disappears when not needed. Fat exists as a food reserve and for the regulation of temperature. Man has little need of it in the first capacity, and in the second its use is dependent on climate and mode of life. The individual living in a temperate or warm climate and actively employed has little need of protection against too rapid radiation of body heat. It is therefore sufficiently evident that with the majority of men fat subserves a small physiological purpose. Moreover excess is a positive detriment both direct and indirect. Every pound of extra fat is a dead load to be carried with every movement of the body. Many an individual of sufficient weight puts on an extra twenty pounds with much complacency, whereas he would regard the perpetual carrying of twenty pounds of lead on his back as an intolerable burden.

In a vague way the impression prevails that carrying an excess of body weight does not entail the same exhaustion as packing an extra-corporeal load. The fact is that the exact reverse is true. Guntz and Schomberg have shown that a soldier marching with a pack weighing forty pounds can do so with an expenditure of energy about 10% less than would be needed to move an equivalent increase in his weight. A little thought will show that this increase in expenditure is due to the extra

strain involved in driving the blood through the unnecessary tissue area; a tax that falls directly upon the myocardium; even though adipose tissue be but slightly vascular, nevertheless the increase in capillary bed, whose friction has to be overcome, involves a great increase in the heart's work. That this is so is evident enough, even in the robust, for there are few fat individuals who can exert themselves without some evidence of hurried breathing, which is direct testimony of a left ventricle struggling with an excess of load. As we shall presently make evident the concurrence of other factors build up a vicious circle of the gravest nature.

Group III.—Toxic Depression.—That we have muscle poisons, and heart muscle poisons, in particular, is well known, leaving aside drugs, there is tobacco as an example, and probably unknown metabolites and bacterial products from the intestine. The depressive effect of the metabolites of muscular activity is fully attested by direct experiment. It can scarcely be doubted that similar bodies from other tissues are responsible for the general muscular weakness and relative myocardial failure in neurasthenic states. No case of seeming insufficiency of the heart can be rationally treated without a full consideration of such a possible toxic basis, and quite often the prognosis rests solely on the question of their possible elimination. We all know how absolutely true this is of the smoker's heart.

Group IV. Abnormal Demand on a Normal Musculature.—This may occur in two ways. (a) The rate of the heart may be increased, other factors remaining unchanged, this means increased work and can lead to even fatal dilatation as sometimes occurs in paroxysmal tachycardia. Such stimulation may be entirely due to disturbance of the central nervous system, and in this form is a prolific source of myocardial insufficiency. Under the influence of anxiety, business stress or severe study the heart rate may remain hypernormal for long periods. A double injury is effected for the total heart work is increased, whilst the shortening of the diastole prevents such a feeding of the muscle as is necessary for a compensating hypertrophy. There is no commoner cause of ruptured compensation in organic affections than the increase of heart work by these psychical influences. We may well believe that in these cases the normal cerebral inhibition of the heart through the vagus is weakened by the concentration of brain work in the psychic areas. Similar increases of heart rate with like result follow the use of certain foods and drugs; tea, coffee and strychnia thus affect the heart, and as these substances are frequently taken by those laboring under mental strain the heart is placed under a double burden.

Different in nature but even more serious in result is the frequently existing concurrent stimulation of the vasoconstrictor system. The absorption of the brain energy in psychic work leads to lessened peripheral control, and this becomes manifest in hypertension of the arterial system. To increased heart rate is added heightened blood

pressure. Little wonder is it that under such conditions we should meet with relative insufficiency. Under the same heading, though occurring under quite other circumstances, must be classed the very numerous cases of arterial hypertension resulting from circulating toxins, the products of defective metabolism, intestinal absorption or a liver deficient in depurative power. It seems to the writer that too much care cannot be given to the individual recognition of those various factors in any given case. Only thus can a rational treatment be instituted.

Group V. Mechanical Interference With Cardiovascular Relations.—Although we know that under extreme conditions of gastric dilatation the fundus may rise high and exercise no small pressure on the diaphragm; yet there is little evidence to indicate that direct pressure is responsible for cardiac distress. The fact that clinically it has been noted that extreme gastric distension is associated with bradycardia suggests that the common arrhythmias and tachycardias of our flatulent dyspeptics are not due to such direct mechanical interference. If gastro-intestinal distensions do not act directly we must then seek a neural via for the undoubted effect, and two distinct channels are easily found. The distension of a hollow viscus is always irritative to its nerve endings, and reflexes are easily started, ending in the heart. Thus Dr. C. F. Hoover quotes a case where the act of swallowing caused intermission of the heart, the reflex arc running over the inferior laryngeal to an abnormally irritable vagus center. Secondly, the visceral irritation may be expended on the vasomotor centers controlling the splanchnic area, resulting in the dilatation of its immense capillary bed and a consequent dislocation of the circulation. Let us note that this means feeble circulation in the extremities, cold hands and feet, diminished blood supply to the brain, with mental depression and lessened ability to perform intellectual work; defective nutrition of the centers and thus loss of control of the heart itself as well as other organs; and we readily see that in this single effect of gastro-intestinal distension, we have an all sufficing explanation of one of our commonest symptom complexes—a syndrome that may or may not be accompanied by manifest evidence of cardiac insufficiency.

Such, briefly, are the fundamental factors in all forms of functional insufficiency. Cases occur in practice in which practically all are present; more commonly they are grouped and stand in a mutually provocative interaction. The individual with a congenitally defective reserve and an irritable nervous system, further adds to his cardiac disabilities by the use of drugs or stimulants that increase the daily labor of the myocardium.

Or take the common instance of the primarily sound man, who through constant excess exhausts the depurative power of the liver and the excretory ability of the kidneys. He is only too likely to combine toxic depression of the myocardium simultaneously with toxic irritation and contraction of the peripheral arteries. The load is increased while the driving power fails. Or lastly, that large

group of cases where without original weakness or acquired abuse, the body weight becomes in great excess of physiologic requirements. The absorption of the heart energy in unnecessary work will, in accordance with the principle that the over use of one muscle entails the loss of energy in the rest, lead to generally diminished activity, building up a vicious circle of increasing disproportion between the weight and work. The increased metabolism induces strain on the emunctories, and their failure involves retention of metabolites and a new cardiac strain, through a toxically induced hypertonus of the arteries.

What wonder is it that obesity, gout (with all its relations) and heart failure stand in close relationship. This particular relation of obesity (even in mild degree) to heart strain is one that has greatly interested me. I have had the opportunity of watching the development of several such cases. I have seen in an otherwise healthy young female in whom the other factors were excluded, the evidences of myocardial weakness and dilatation of the heart wax and wane with the body weight and ultimately disappear with a final approximation to a normal adiposity. I am assured by the results of treatment that in many of the middle-aged that reduction of weight is alone needed to restore the balance between heart work and body work. It is a rather curious fact that this relation of the mechanical work of the heart to that of the organism is but little dwelt upon in text-books of physiology and no vivid realization of its import is present among the mass of medical men. Partly out of curiosity and partly in the search for further information on the subject, I recently inquired of a number of my colleagues what proportion of the daily expenditure of energy is to be allotted to the heart, and none seemed to know, even approximately, nor did the text-book enlighten them. Accepting 300 gram-meters as about the average energy of a single heart contraction, the heart labor per hour would equal about 1000 Kg. M.—as light muscular work expends about 5000 Kg. M. in the same period,—the work of the heart as compared to the muscular work of the body is about one-fifth. Taken in another way we may accept the estimate that the daily work of the heart is equal to two hours of severe physical labor, as a man cannot keep up such labor more than eight hours, we obtain a relation of one to four. Now in obesity the hyper-nutrition is diverted from and not to the musculature of the body, and the tendency that is present in the athlete or laborer to develop the heart *pari passu* with the other muscles is wanting, so that in the apportionment of a daily expenditure in terms of muscle work the heart is at an increasing disadvantage. The great significance of these facts lies in the natural corollary that the excess of weight should be reduced by subnormal feeding rather than by excessive exercise. It is self evident that if the food intake falls below the minimum caloric expenditure, the balance must be made good from the starved adipose tissue and the weight will fall. If at this time physical exertion is added, while it may more rapidly decrease the weight it

will add materially to the work of the heart and may easily cause trouble. If a rapid decrease is desirable, it is better effected by starvation and sweating than by work.

It is pertinent to note at this place that in conditions of general malnutrition the heart is equally at a special disadvantage, for the reason that while it uses up one-twentieth of the normal income its weight is only one two-hundredth; that is, it requires proportionately ten times as much nourishment as the body.

In planning this paper I expected to deal with the treatment of these cases, but time limits compel me to relegate this to a future occasion. It but remains to summarize my conclusions:

First—There are a group of cases in which, without organic change, the heart is unable to function normally.

Second—While the symptoms may be the same, the underlying pathogenesis may be widely different and is susceptible to analysis into the classes enumerated in this paper.

Third—No correct prognosis can be made or rational treatment instituted until these pathogenic factors have been recognized and assigned their proper value.

Fourth—The need for correct treatment is imperative, for if the insufficiency is merely palliated and its causes not removed, perverted function will ultimately lead to organic changes.

Discussion.

Dr. W. F. Cheney, San Francisco: This, of course, is distinctly the day of the myocardium and we are working under the theory of myogenic origin of most heart symptoms. Just at the present time the great majority of trouble is with the myocardium. There is no doubt about the vast importance of this part of the heart. There is also no doubt about the possibility of what Dr. Power has said to us to-day being correct, but after all it seems to me the practical point is to be able to determine if possible when the heart muscle is really diseased and when there is simply a functional incompetence. As he says, the symptoms are practically the same whether the trouble is one of true organic change in the walls or whether it is simply an inability of the heart muscle to meet the strain put upon it. In other words whether we are dealing with a functional disease of the heart or whether a true organic disease of the heart, is one of the difficult problems to solve. As I heard Dr. Osler say: It is a very disagreeable matter to tell a man that the symptoms of which he complains indicate no particular trouble with his heart and to read the next morning in the paper of his death. This is not uncommon. That means that with the best ability and study and care we are not always able to discriminate whether the trouble is functional or organic. Dr. Power has not gone into the subject of the means by which we discriminate. That is most important. The findings as he has outlined them are the same as far as the physical examination is concerned. By the ordinary methods, the condition of the pulse, to the finger, determining sounds with the stethoscope—there is no possibility of detecting any fine change and yet at this time we have more than the everyday methods of examination of the heart that carry us beyond the old ordinary physical methods. Not to go into detail, we have the determination of the venous pulse, we have the X-ray, and we have something new, the electric cardiogram. With all

of these finer methods it is gradually going to be possible to tell our patients whether they have simply a functional disturbance or whether they have a change in the structure of the muscle. Not until that time can we give a fair prognosis. We cannot begin to say whether that patient is in danger of immediate or sudden death or whether the condition is a harmless one. At the present time we all are subject to error. It is only by the addition of these methods and general acceptance of these methods that we are going to be able to eliminate error. There is scarcely any other organ of the body, where, after doing our best, we are still unable to reach an accurate conclusion.

Dr. F. M. Pottenger, Los Angeles: The trend of recent study in the field of the circulatory system has shown that the condition of the heart muscle is far more important than the murmurs which are often heard. It is easy to understand how the heart muscle must be influenced by the various toxins which are circulating in the blood. We often see the effect of this in acute infections. The effect of athletics upon the hearts of growing children is a very important subject. We all know that many young men are injured for life upon the athletic field because of heart strain. Such things should not be permitted by the school and university authorities. It is time that the medical profession is taking a decided stand on this point.

The influence upon the heart of large increase in body weight is a question well worthy of thought. It is commonly observed that men who are very fleshy, especially if they have a much greater amount of body weight than their height and their age would warrant, are prone to suffer from diseases of the heart and kidney. This is probably due to the fact that these two organs are over-worked in taking care of the weight in excess of what they were intended to care for.

I have had abundant opportunities to observe the effect of rapid gain in weight upon the heart in tuberculous patients, especially those suffering from advanced tuberculosis. These patients as a rule are soft, they suffer from shortness of breath, their weight is mostly fat and instead of indicating a condition of good nutrition represents really a state of weakness. The old method of feeding the tuberculous patients with enormous quantities of food, expecting them to put on three to five pounds of weight a week and keep this up until they had far surpassed their normal weight without taking into consideration the power of the heart, has been disastrous in many cases.

I have learned that a gain of one pound a week or two pounds a week, if the patient has lost considerable, is far more satisfactory than rapid increase in weight.

I have had the opportunity on a number of different occasions to observe the development of myocardial change and cardiac dilatation in patients suffering from pulmonary tuberculosis. The symptoms which were first shown in these cases have been slight nervousness, insomnia and rapid action, also slight dyspnea. These symptoms are usually slight for several days before the final break in compensation. If we wish to serve our patients, who are suffering from cardiac disturbances best, we will pay more attention to the condition of the heart muscle itself and less attention to the blowing murmurs than we formerly did.

Dr. D'Arcy Power, San Francisco: I can add little to what I have already stated in the paper, but it seems necessary to emphasize the fact that refinements of diagnosis can never afford a basis of interpretation of these cases; and for a very good reason. The signs revealed by physical examination yield us information as to size, thickness of walls, strength and order of movements, but, they can give no account of the nature of the underlying structural changes of the myocardium whereof they are the expression. It must be clearly realized that an insufficiency is the same whether it be of

organic or functional causation. Its nature must be determined by a consideration of the accompanying and secondary phenomena and it is to the elucidation of this often very complex problem that I hope the classification I have given may afford some help. Dr. Pottenger's remarks on the bad effect of excessive feeding are of the greatest interest to me, it adds increased strength to the conviction that I have long held that we have no greater enemy than too much fat.

THE TREATMENT OF HEMOPTYSIS IN TUBERCULOSIS.*

By MAX ROTHSCHILD, M. D., San Francisco.

One of the most erratic and most alarming symptoms in tuberculosis of the lungs is hemoptysis,—erratic because we see many cases of advanced phthisis which never have had a hemorrhage, or even a trace of blood in their sputum; and we see other cases in which a sudden hemorrhage is the first symptom of the disease. I have at present three cases under treatment, which have practically no cough and no expectoration. One of these (a young Spanish boy sent to me by Dr. Fehleisen) twice was near death from severe hemorrhages; and in this case, as well as in the two others—which I will discuss later on account of their interesting courses—it was difficult to locate the spots which caused the bleeding. On the other side, I have seen, as we all have, a great many cases of advanced phthisis which never have had a trace of blood in their sputum: some of them died without ever having a hemorrhage, others had only slightly discolored sputum at times. One can never say when a hemoptysis will occur, and one cannot prevent it. It would be useless to speak about the alarm which a hemorrhage causes even in cool-headed and brave patients, and the terrible excitement it produces in nervously inclined individuals. It is a constant menace to all patients who are suffering from a phthisis, and this menace is never removed until the patient is entirely cured.

The treatment of a sudden hemorrhage is sometimes quite difficult. If a patient shows bloody sputum, we are able to guard against an imminent hemoptysis through absolute rest, morphin, ice, etc., but if a sudden and intense bleeding starts, what is the best, the quickest, and the surest way to stop it?

I do not intend to discuss in this paper the different drugs and manipulations which have been in use. They are too well known to every practitioner—and every practitioner knows fully as well that all these drugs and manipulations are unreliable. Sometimes they seem efficacious, other times they do not. Sometimes the bleeding stops—possibly as a result of the drug used or as a result of the absolute rest, or possibly of its own accord, because the patient may have lost so much blood that the reduced blood pressure makes coagulation easier.

* Read at the Forty-first Annual Meeting of the State Society, Santa Barbara, April, 1911.

The more modern remedies, such as gelatin, calcium chlorid, adrenalin, amyl nitrite, are also unreliable. The gelatin perhaps acts the best if properly given. I have used it a great deal, and while it has evidently been of service in some cases, it has not had the desired effect in others. The tight strapping of the side from which the bleeding arises with adhesive plaster works well at times, but this is also unreliable.

Under these circumstances it seems that any method which appears to give more definite results, should be most welcome; and these results seem attained with the production of the artificial pneumothorax. The method was first introduced by Forlanini for the treatment of tuberculosis, and has since been used in many clinics and sanatoria with more or less good results. The technic of the operation is simple and may be found in the publications of Brauer of Marburg, Lucius Spengler of Davos, and Murphy of Chicago, as well as in the publications of Forlanini himself. The most important contraindication, in the opinion of all authorities, is a severe lesion in both lungs.

Forlanini gives the following three indications for the production of an artificial pneumothorax:

1. In uncomplicated cases of one-sided phthisis with slow or subacute course and with free pleura, without regard to the degree of the lesion.
2. In cases where adhesions exist, if these adhesions can be removed by artificial pneumothorax.
3. In cases of double-sided phthisis which do not show an acute course, and where the lesions in both sides are not far advanced.

Karewski, in his paper in the *Zeitschrift für Tuberkulose*, Vol. xiv, Part 6, discussing the newer methods of surgical treatment of tuberculosis of the lungs, speaks well of the artificial pneumothorax. He says, however, that it is only indicated when all physical and dietetic means have been exhausted, and that it is absolutely contraindicated when the other lung is involved. The autopsies of patients who were treated with artificial pneumothorax, but who died in spite of its use, showed that the clinically observed improvements corresponded with the post mortem findings. In the lung which was artificially compressed were found a large amount of interstitial tissue and indications of scar formation; only a very few fresh tubercles were found and these contained a surprisingly large amount of dry, cheesy degeneration; *in toto* signs of a reparative process. He also found that in the clinical picture of properly selected cases, the weight of the patient increased and the general condition improved considerably; he noticed a decrease in the number of bacilli, and a disappearance of the elastic tissue in the sputum, which itself became less and often disappeared entirely.

The latest publication, which only appeared about four weeks ago, is a collection of cases by Brauer and Lucius Spengler, in Brauer's *Klinik der Tuberkulose*. It gives a report of 102 cases, each case described in detail, and afterwards shortly and exactly discussed. In the last one of these 102 cases the indication for the treatment with artificial pneumothorax was a very severe hemoptysis. The patient, who was in the end of the third stage, died

two and a half weeks after the operation, and at the autopsy it was impossible to find a ruptured or lacerated blood vessel. This is the only case which I can find in the entire literature where a hemoptysis has been made the indication for an artificial pneumothorax.

It had appealed to me, ever since I read Forlanini's first publication, that a good compression of a bleeding lung with nitrogen should act like the compression of a blood vessel during a surgical operation; and for this reason, and also in consideration of the fact that we know of no remedy which will stop hemorrhage with certainty, I have for the past few years treated all cases which came under my observation, and which showed an obstinate tendency to bleed, and where none of the above mentioned contraindications were present, with artificial pneumothorax; and in every case, without a single exception, I have been able to stop the hemorrhage promptly.

Last September I read a paper on this subject before the State Medical Society of Nevada. With Dr. Fehleisen of San Francisco, I had already used the method in quite a number of cases of tuberculosis; the report and reprint of that work will appear shortly. So far as known to me, hemoptysis has not been considered a special indication for this operation, with the exception of the one case (No. 102) recently published by Brauer and Lucius Spengler; and yet it seems to me to be the one complication in which the most satisfactory effect of an artificial pneumothorax is evident. It also appears to be a logical operation—the diseased lung can obviously be kept a great deal more quiet if it is compressed by nitrogen than by either an opiate or an adhesive strap. So far I have used it in fifteen cases, and naturally this report is to be considered a preliminary one. The cases have not been long enough under observation to make deductions in regard to ultimate cures—and that is not the object of this paper anyway—but, as mentioned before, in all our cases the compression has stopped the hemoptysis promptly. The operation itself is simple, if properly performed seems to be harmless, and can be done quickly. The only difficulty is in choosing a proper place for the first inflation. One must be sure that adhesions do not exist between pleura pulmonalis and chest wall. The needle is connected with the nitrogen tank and also with a manometer, and a negative pressure in the manometer, followed by fluctuations with in- and exhalations, shows distinctly whether the point of the needle is free in the pleural cavity. It is wise to make an incision for the first inflation, and to then let in enough nitrogen to get a neutral pressure in the manometer. At the second inflation it is easy to find the original air bubble through percussion. Some of my cases have been seen by Dr. Freytag, who was kind enough to take X-rays of those cases where it was difficult to ascertain from which side the bleeding originated, or where we wanted to be sure that the other side was not involved in a tubercular process. The following cases may be of interest:

A young servant girl about twenty years old had been expectorating blood without having much cough or any other pronounced symptoms. There was no

considerable loss in weight; she looked well, and was able to do her work. The upper lobes on both sides showed sharp breathing during exhalation, and only on the lightest percussion was a slight dullness evident over the left upper lobe anteriorly. She went to the Walker Hospital in the beginning of May, 1910, and after a couple of weeks' rest and treatment she had very little cough, and very little sputum, which was entirely free from blood. She had gained four pounds during the two weeks, and could stay in bed no longer on account of lack of means. She took gelatin internally from the start, but she had left the hospital only three days when she again began to expectorate blood. This lasted for six weeks. Whenever she stayed quietly in bed for a couple of days the blood disappeared; as soon as she got up she expectorated blood again. With the kind help of the Associated Charities I was able to take her to our Sanatorium in Belmont, where we inflated her the end of July. We kept her in bed about three or four weeks, and re-inflated according to the necessities of the case. Then the patient got up, and is now working as one of the upstairs girls in our Sanatorium. The left lung, from which the bleeding came, is still compressed, but she is able to get around quite lively without any apparent shortness of breath, and she has not had even a trace of blood in her sputum since the first inflation.

A very similar case is that of a young man about twenty-eight years old. He had been a clerk in a dry goods store, and his sickness began with a hemorrhage. He had been part of the time in the country, part of the time in a hospital in Oakland, and had been under treatment for four months; but whenever he started to walk he began to expectorate blood. He went to the Walker Hospital the first of April, 1910; he had no fever, and but little expectoration, which was almost entirely blood. Very frequently he expectorated about a small wine-glassful of pure blood. We inflated him for the first time on April 11th. After the first inflation, which was evidently not sufficient, he continued to expectorate blood, but not quite as much as before. After the second inflation, which produced a high positive pressure, he did not expectorate blood, and has not done so up to date. He is walking around again and is doing quite a little work on a small farm in Los Gatos. This case is interesting on account of the difficulty of locating the diseased side. The man evidently had an old process in the left lung, which showed sharp breathing. The same sharp breathing, without any rales, appeared on the right side. The X-ray taken by Dr. Freytag showed spots in both lungs, but more pronounced in the right side. This harmonized with our findings, and so we inflated the right side which proved to be correct.

All the other cases which we have treated so far, reports of which will appear in print, have shown the same good results in regard to cessation of the hemorrhages, and I feel justified in recommending the treatment of hemoptysis with the artificial pneumothorax, according to Forlanini's method, for your consideration.

Discussion.

Dr. C. C. Browning, Los Angeles: The subject is an exceedingly interesting one and certainly this paper is of more than ordinary interest in that it has dealt chiefly with the new method employed in these cases—addressed specifically to this particular symptom of hemoptysis. As this is in the nature of a preliminary report; I shall look forward with a great deal of interest to further observations in this particular field. The proper consideration of hemoptysis in phthisis must first be founded upon the causes which produce hemoptysis and for that reason there is no one method that can be applied to all cases, so that with the difficulties which we meet we certainly welcome all that promises aid in this distressing and occasionally fatal symptom, and more frequently indirectly fatal complication. The occasion of hemorrhage may generally be said to be

due to a condition of the blood vessel accompanied by increased blood pressure, so that for those who are predisposed to hemorrhage as well as the ordinary treatment of the case, the phase we can most readily combat is the decrease in blood pressure, because the disease of the blood vessel is beyond our control. Another factor most desirable, is the eliminating of exercise either physical or mental. And another feature to be mentioned is that of atmospheric pressure. I made a series of observations while connected with the Sanitarium extending over a year and a half, in which time the barometric pressure was recorded and compared with the charts showing different degrees of hemorrhage from slight color up to profuse hemorrhage occurring among our patients and we found that at such times as the barometer varied within 24 hours 10/100 of an inch or more, more than $\frac{3}{4}$ of the hemorrhages occurred in our patients. It is also true that at such times the patients who suffer from bronchorrhea suffer more at these times. We have also noticed that our hemorrhages occur in groups. With patients having a tendency to hemorrhage the treatment is greatly aided by keeping the patients quiet, thus reducing the blood pressure as much as possible and giving some remedies known to reduce blood pressure. Another agent that has been spoken of frequently by men in sanatoria is tuberculin. It is the consensus of opinion that patients while under tuberculin treatment are less subject to hemorrhage than they were previous to treatment. It is also said that the proportion who have not had hemorrhage previous to treatment, after treatment is very small. This is attributed to the infiltration about the seat of the tubercular process. I have had no experience with the special treatment recommended by Dr. Rothschild. We are all aware that attention was drawn to this treatment 20 or more years ago and then it subsided to a certain extent and was later revived again by Murphy of Chicago. It was my fortune to have under my care one of Dr. Murphy's patients who had been treated by a production of artificial pneumothorax. This patient was under treatment about six months. The results were not especially encouraging, but in the light of later work done along this line, it is possible that longer treatment might have resulted more satisfactorily. The patient had numerous hemorrhages and the disease finally resulted fatally. The fact that only comparatively few patients may be suitable for this treatment is no argument against it, for if it is of value in a certain class of patients, it is equally important to them. My understanding is, that where the lung has been kept compressed from one to two years, generally the lung becomes a mass of fibrous tissue, thus rendering it of no value for future use. The question naturally arises, what length of time the author of the paper would suggest to keep a lung compressed when he had compressed it for the relief of hemorrhage. Would we be justified in keeping a lung compressed until it should lose its function to avoid the dangers incident to this complication? I desire again to thank Dr. Rothschild for bringing this subject before us, for it approaches the control of this complication from the standpoint of the control of hemorrhages in other portions of the body, and I shall await with more than ordinary interest, further reports.

Dr. F. M. Pottenger, Los Angeles: The more I have to do with tuberculosis, the less I know about hemorrhage. I have studied this subject a great deal and have attempted to classify the various kinds of hemorrhage, so that I might arrive at a rational method of treatment, but so far I have nothing that I can offer.

Regarding the suggestion of artificial pneumothorax as made by Dr. Rothschild, I cannot feel like enthusing over it. I cannot feel that it is practicable in many cases nor can I believe that an indication for such interference would come often in practice. I know that these cases which bleed more or less constantly are very distressing and difficult to

handle, but personally I would hesitate to perform an artificial pneumothorax upon them as a remedial measure. My method of treating hemorrhage has always consisted of very little interference. I aim to quiet the patient in every way possible, keep him perfectly at rest physically. If the hemorrhage is large, not even allowing him to move his hand or foot, quieting his nervousness, and aiming to relieve him of all fear. By so doing we take away those things which raise blood pressure and in this way aid in stopping the hemorrhage. I do not believe in examining a patient during hemorrhage, in fact, I do not turn the patient over nor allow him to move from side to side, but keep him lying quietly. Personally I have had considerable difficulty in being positive that I was locating the point of hemorrhage. As soon as the blood trickles out into the lung it usually finds its way into distant parts from the point of bleeding and unless there is a constant oozing which produces a localized point of constant moisture, it is a very difficult problem to be sure that we are right in locating it, and if the hemorrhage is large in size at all the blood is inclined to find its way into both lungs and makes it very uncertain where the bleeding is coming from. I am not in the habit of using much morphin in the treatment of hemorrhage. I use as little as possible, and never give it unless the patient is extremely nervous or the cough is extremely troublesome. When I do use it I employ small doses, usually giving 1/16 grain hypodermically. I find that this has a quieting action without numbing the sensitiveness of the bronchi and favoring pneumonia. I rely more particularly on such measures as are known to reduce blood pressure, the nitrates and especially veratrum viride. I have never felt that the coagulability of the blood is at fault. I have yet to see a case where I felt that it was necessary to increase coagulability, on the contrary we very often find it difficult for a patient to get the blood out of his mouth, it coagulates so quickly. If pneumothorax were to be produced we would have to have certain conditions present. We could not have an adherent pleura, and the other lung should be practically sound, a condition which is not usually found, especially if the disease has extended beyond the early stage. I believe that the operator should be thoroughly conversant with the patient. I do not believe it would be wise to undertake this procedure upon a patient whom he was seeing for the first time, and the operation to my mind should be performed only in a hospital or sanatorium where the patient would be under the constant care of the physician. While I would not want to discourage anything that offers benefit to these cases, I personally should prefer to follow out treatment along the lines which have given me good success and not endangered the patient.

Dr. H. D'Arcy Power, San Francisco: While I have no personal experience of arresting hemoptysis in the manner advocated, yet I realize that we are here dealing with a method that is at least physiologically sound. This is by no means always the case with lung therapy, and we still find men using ergot and adrenalin, notwithstanding that it was definitely demonstrated by the careful experimental work of Dr. Carl Wiggins that the total blood flow through the lung is increased by the administration of adrenalin. That artificial pneumothorax has dangers may well be admitted, but so has persistent hemorrhage; and be it remembered it is just as easy to decompress as compress the lung if a mistake is made.

Dr. Rothschild, closing discussion: Dr. Pottenger is correct in two respects, namely, that it is wise to interfere as little as possible in cases which have hemorrhages, and also that the method is not one for the general practitioner. But I am not talking about cases which bleed a little and then stop; or about cases which have a severe hemorrhage, perhaps another, and then stop; in such cases I should

not think of operating. I do not by any means want to create the impression that as soon as one of my patients shows blood in the sputum I produce an artificial pneumothorax. If the hemorrhage is easily controlled, and does not recur too often, we treat it in the usual old way; but I am talking chiefly about cases in which the hemorrhages are very profuse, and obstinate in their recurrence. It is also useless for me to state that I do not move the patients unnecessarily, and that if the patient is brought into the operating-room, it is done most carefully. That is only common sense, and any man, with any experience at all, would be careful about those things. I also agree with Dr. Pottenger that the operation is not one for the general practitioner, as stated before, because he has neither the apparatus nor the experience to perform it. It would be advisable for the general practitioner to send such cases to a sanatorium. But I do believe that every institution for the treatment of tuberculosis should have an apparatus for the production of artificial pneumothorax ready for use. I do not agree with Dr. Pottenger or Dr. Browning in regard to the limitations of the operation. The publications which have appeared on the subject lately bear me out in this, and the latest work of Spengler and Brauer, which I have mentioned before, has shown remarkable results in cases where both sides have been affected, one, of course, not extensively. I must repeat that I am not talking about the treatment of the tuberculous infection itself with artificial pneumothorax; but I am talking about cases which have hemorrhages, and in which we have no choice in regard to the means of stopping them. I would rather produce an artificial pneumothorax, even if the case is not a proper one according to the indications for the operation, than allow a patient to die without trying to stop the hemorrhage by this means. In regard to the pressure which I am using during operation, I try to get a neutral pressure with the first inflation. We usually stop when the manometer shows 1-2 cm. positive pressure during inhalation, and during exhalation 1-2 cm. negative pressure. With the second or third inflation, I try to produce a positive pressure of 2-6 cm.

In regard to Dr. Murphy's case, which Dr. Browning mentions, it is of course impossible for me to explain the reason for the frequent hemorrhages after the operation. Might it not be possible that they came from the other side? I can only say that in all my cases, the artificial pneumothorax has stopped the hemorrhages promptly and absolutely. We keep the lung compressed for a year or longer, the time depending entirely upon the condition of the patient. I believe that we are undoubtedly justified in producing an artificial pneumothorax in profuse hemorrhage, even when only a small area of the lung is involved, if the hemorrhages are obstinate, and if the operation is not otherwise contraindicated.

THE HYPODERMIC USE OF HEXAMETHYLENAMIN. (C₆H₂)₆N.

By F. F. GUNDRUM, M. D., Sacramento.

The first work published concerning the excretion of hexamethylenamin, when used on laboratory animals and clinically, was that of Crowe,¹ in 1908. He was able to show in the laboratory that, following the administration of hexamethylenamin by mouth, the drug was excreted in the bile, pancreatic juice, saliva, milk, and urine of dogs. After the administration of 0.5 G by mouth to a rabbit, a positive test was obtained from the blood within fifteen minutes, although the maximum quantity,

judged by colorimetric methods, appeared about five to eight hours after ingestion. Clinically, he was able to prove its presence in the bile, urine, cerebro-spinal fluid, joint fluid, and a pleural effusion following the giving of 10 gr. to 75 gr. a day. He demonstrated a marked germicidal action in cases of gall-bladder fistula, the number of bacteria diminishing rapidly and ultimately disappearing completely so that no growth occurred on culture media.

Of special interest was a case of infection of the cerebro-spinal tract, purulent meningitis following an exploration, which cleared up under rather full doses. Following this work, many cases of infection of serous cavities were treated with hexamethylenamin, and a few reports have been published corroborating the work of Crowe. It was but a short step from the curative to the prophylactic exhibition of an agent whose effectiveness was apparently so definitely demonstrable. The custom was established on Dr. Cushing's service of giving from 30 to 60 grains by mouth to all cases with compound fractures affecting the meninges or central nervous system immediately upon admission to the hospital. On the general surgical service, Dr. Halsted's, 15 to 30 grains were given 1 to 2 hours before catheterization of a non-infected bladder whenever circumstances permitted.

While resident on Dr. R. T. Miller, Jr.'s, service at the St. Francis Hospital in Pittsburgh, we followed the custom above mentioned, giving from 15 to 30 grains before catheterization and 30 to 60 gr. to cases of compound fracture of the skull, as soon as admitted to the hospital. One night, a case was brought in with a compound skull fracture, very dirty, but already vomiting and semi-comatose from increased intracranial pressure. The indication for hexamethylenamin seemed so urgent that the patient was given 30 grains hypodermatically at once, and the dose repeated upon his leaving the table after decompression and elevation of fragments. The ordinary tablets were merely boiled up in water and injected rather deeply into the thigh. I had considerable misgivings as to the amount of irritation which would be produced because it is comparatively easy to break hexamethylenamin down, liberating formaldehyde. No local irritation developed, and the patient recovered without a meningitis. A short time after that, an opportunity presented itself for using hypodermic injection upon an individual not mentally dulled, a case of acute retention, due to stricture of the urethra. He complained slightly of burning for fifteen or twenty minutes after the injection of 20 grains, but the following day all irritation had subsided.

The very slight irritation following the hypodermic use of hexamethylenamin has encouraged me to use it subcutaneously or intramuscularly whenever it is desirable to produce, if not an actively germicidal, an at least inhospitable medium for bacterial growth in any serous cavity, or the bile or urinary passages within a short space of time. This is particularly valuable if the patient is nauseated, comatose, or about to be operated upon when the

post-anesthetic vomiting too frequently empties the stomach of any drug and often prevents medication by mouth for several hours.

The frequent, early and generous exhibition of hexamethylenamin, particularly in cerebro-spinal cases is of exceeding value in the prevention of meningeal infection. It is not often able to affect to anything like so great an extent a case of meningitis, once established. The hypodermic use, too, is often of great value to the internist, as in the following recent case under my care. Mr. A. suffering from tabes dorsalis, with relaxation of vesical and rectal sphincters coming on during a severe gastric crisis. He had persistent dribbling, but without retention. As a natural consequence, so far as the bladder was concerned, he developed a rather severe cystitis with considerable mucus, an alkaline urine and many bacilli of the colon and proteus groups. He was given 10 grains of hexamethylenamin three times per day hypodermatically for a period of two weeks, in addition to the usual daily irrigation with warm boric acid solution. No local disturbances followed the injections and no objective irritation was noted. From these few cases and from others not reported here, it has seemed good practice at times when an early exhibition of hexamethylenamin is indicated, as a prophylactic measure, for example where catheterization or other genitourinary manipulation is necessary, and especially where meningeal, or possibly also joint infection is feared, to use the drug hypodermatically until such time as the administration by mouth can be taken up.

A REMARKABLE CASE OF CHICKEN-POX.

By EDWARD GRAY, M. D., Eldridge.

The case to be narrated was remarkable for the number and character of the complications and for the way in which it ended. We are so accustomed to thinking of varicella as a trivial ailment that it is a shock to find such a patient die.

Viola G., sixteen years of age, had been for several months an inmate of the Sonoma State Home (for the feeble minded) of California. She came to the Home because of epilepsy from which she had suffered since she was five years old, the seizures latterly being of a minor character. In addition to this she was choreic and had hypermetropic astigmatism. For this condition I recently prescribed corrective spectacles. The nervous twitching, when spoken to, was very apparent.

Her application-blank briefly records that she "had measles when five years old, caught cold, then typhoid fever and spells (epileptic) ever since." She distinctly improved after coming here and after a time was given some light work in the clothes-room.

Eight days after admission she had a series of epileptic seizures, the record standing simply "many"; for three months following, an average of 17 to 19 per month; then they decreased, for the last three months, to only two or three per month and these of light character. Her general health was therefore distinctly improved when on February 25, 1911, she was found to have varicella and was sent to our hospital. There it was noticed in a few hours' time that the patient was exceedingly nervous and restless, while the pocks were not numerous and itching hardly complained of. On this first night she was found jumping out of bed and wandering about the ward and next day she had to be restrained because of the excessive restlessness and nervousness. Succeeding this stormy period there was a time of petulance and then of apathy.

1. Crowe—Johns Hopkins Hosp. Bull., Vol. XIX, No. 205, April, 1908.

Her eyelids twitched and she did not want to talk or to be questioned. On March 2nd she was found delirious and very restless while her temperature was 105.4° F. At 4:20 p. m. the temperature was 107.4° (all temperatures are per rectum); while the respiration rate was 54. The temperature fell slowly through the night to 104° at 5:00 a. m. At this hour the pulse and respiration rate could not be taken and are marked "?".

The temperature was never again as low as 104°. At 8:45 next morning (March 3rd) the temperature was 105.4°, exactly the same as twenty-four hours previously. The heart sounds were now poor and endocarditis had been suspected nearly a day previously. The stage of excitement had now passed into stupor sometimes interrupted by delirium. She had a meningitis but as she was not under my care I cannot state whether the Troussseau taches cérébrales were present. During the following night the nurse reported that she could not get the pulse at any time. During the 3rd and 4th the temperature stood at various figures between 104.6° and 105.8°. On the morning of March 5th she was again restless at frequent intervals. At 11:15 the temperature was 106.3°; pulse ?; resp., 68; at noon was much weaker. At 1:00 p. m., temperature, 107° F. ?; resp., 54, and in five minutes she died.

The foregoing might be considered as remarkable enough but there is more yet of the history. A post-mortem examination was held which revealed a granular meningitis, a fresh pleurisy upon the right side, old vegetations upon the mitral and tricuspid valves with a relapse of endocarditis; and the left lung reduced to a small, formless mass through fibroid phthisis. The meningitis was probably tuberculous in character.

The kidneys appeared to be normal.

In such literature as is accessible to me I have found only one reference to meningitis as a complication of varicella. It is by Dr. W. F. Waugh (in the text-book of Alkaloidal Practice, p. 145) and reads: "The writer lost a child from meningitis suddenly developing during an attack of varicella." It was the meningitis which killed in the case here reported and not the slight endocarditis or the beginning pleurisy.

Here then in one individual were united these varied pathologic conditions; namely, epilepsy, chorea, hypertropic astigmatism, fibroid phthisis, pleurisy (with just beginning effusion) chronic endocarditis with vegetations and a beginning acute stage, varicella and acute granular meningitis. This is surely a remarkable combination if not quite a unique one.

The practical lesson to be learned from the history here narrated is to be on the watch for heart and meningeal complications in even seemingly simple cases of varicella.

REMOVAL OF THE TESTICLE—A CRITICISM BY DR. MARK EMERSON.

To the Editor of the State Journal: In the case of a congenital inguinal hernia in a child four years old, reported in the March number of the State Journal, page 110, by Thomas Garfield Dodds, M. D., the writer states that this case was complicated by an appendix and an undescended testicle in the hernial sac.

Allow me to quote a few lines of his article under operative technique:

"Undescended testicle found in sac just above appendix; impossible to draw testicle down into scrotum. Testicle about one-third size of left testicle. Removal of testicle. Typical Bassini operation completed on right side."

This is the second instance that I know of in which the testicle has been removed in the course of an operation for inguinal hernia, and it is, on this particular point, that I raise my objection.

None of the best surgical authorities recommend the removal of the undescended testicle.

As a last resort it may be placed within the abdomen and even that is seldom necessary, since the introduction of the Bevan operation for loosening up the Vas Deferens within the abdomen, partially dissecting the testicle from the cord until only the Vas is left attached to the epididymus.

These small testicles generally regain their normal size when liberated from the inguinal canal and placed in the normal position.

This individual cannot join the army or navy. It also has a bearing on life insurance as well as marriage.

Treves calls our attention to the strong physical effect on the individual.

The legal aspect of removal of a testicle in a child would prevent me from ever putting a case into public print.

The small size of this testicle was not due to atrophy or disease, it was simply undeveloped.

Its parenchyma normal and capable of secretion and this internal secretion certainly has something to do with the characteristics peculiar to the male.

The typical Bassini operation referred to, means to dislocate the cord to the upper part of the wound, bring it out above the coaptation of the internal oblique and conjoined tendon, to the shelving portion of Poupart's ligament. Owing to the length of cord necessary by this technique, it is the one operation that should not be done for undescended testicle.

If the testicle is removed because of the shortness of the cord how could one transplant that which does not exist?

How, then, could a "typical Bassini" operation be done in this case?

Besides the gain in length of the cord attained by the Bevan operation, the cord itself is capable of considerable distensibility.

If the cord is not disturbed but allowed to come out of the lowest part of the wound, considerable length would thereby be gained in the Vas Deferens.

It is possible that there are other complications in the case not mentioned in the article and I believe that the writer is broad-minded enough to know that I have no personal prejudice in writing this criticism.

Yours respectfully,

DR. MARK LEWIS EMERSON.

PROCEEDINGS OF THE SAN FRANCISCO COUNTY MEDICAL SOCIETY.

Regular Meeting Tuesday, May 9, 1911.

Program by the Alameda County Medical Association.

1—Rabies in California. W. A. Sawyer. Discussed by Drs. Wellman, Ophuls, Tait, Sawyer.

2—Salvarsan Treatment of Leprosy. Thos. J. Clark. Discussed by Drs. Oliver, Schmitt, Mead, Clark, Wellman.

3—Chronic Inflammations of the Prostate. Daniel Crosby. Discussed by Drs. Emerson and Krotosziner.

4—Genesis of Incipient Tuberculosis. Edward Von Adelung. Discussed by Dr. Voorsanger. (This paper will appear in the Interstate Medical Journal.)

5—Auto Accidents from Detachable Rims. Mark Lewis Emerson.

Section on Surgery, Tuesday, May 16, 1911.

1—Presentation of a case. T. W. Huntington.

2—Presentation of a Case. H. C. McClenahan. Discussed by Dr. Hyman.

3—Demonstration of Application of Plaster Jacket for Curvature of Spine. James T. Watkins.

4—Present Method of Conservative Treatment of Tubercular Joints in Use at Children's Hospital. Geo. J. McChesney. Discussed by Drs. Smith, Crane, Hunkin, Sherman, McChesney.

Eye, Ear, Nose and Throat Section, Tuesday, May 23, 1911.

1—Report on Italian Eye Literature. E. C. Sewall.

2—Report on Italian Ear, Nose and Throat Literature. V. F. Luchetti.

3—Orthodontia in Relation to Otology, Rhinology and Laryngology. Roscoe Day, D. D. S.

Rabies in California.

By W. A. SAWYER, M. D., Director of State Hygienic Laboratory, Berkeley.

For a year and a half there has been prevalent among dogs in certain parts of California, a disease frequently transmitted to other warm-blooded animals, including cattle and horses, and also to man. Rabies, or hydrophobia, is a striking example of those diseases which are perpetuated among certain animals and occasionally are transmitted in one way or another to man. Other familiar examples of such diseases are glanders in horses and mules, anthrax in cattle, and bubonic plague in rodents, all three of which diseases exist in California in animals, but seldom attack man. Rabies, while essentially a disease of dogs, is very apt to secure victims among valuable domestic animals and human beings, owing to the excitement and delirium which cause many of the infected dogs to travel about and to introduce infectious saliva with their teeth through the skins of animals and persons. While the control of anthrax and glanders offers difficult and complex problems, and while the safety of human beings from plague was accomplished in our state only through the expensive destruction of rats and their hiding places, rabies can be suppressed and even entirely eradicated in a definite circumscribed area by making it impossible, by muzzling, for dogs to bite, and by preventing dogs from entering infected regions until proved by a six months' quarantine to be free from the disease. Such methods have freed the island of Great Britain from the disease, and quarantine has kept the malady out of Australia.¹ These experiences, and many others in Europe and America, have shown that rabies may be suppressed with simple measures if they are thoroughly enforced, and that it is therefore a disease so decidedly preventable that it is a reproach to any community to have an outbreak occur and spread.

The Pacific Slope, after a long freedom from the disease, has at last been forced to add rabies to the list of diseases which demand suppression through concerted activity of the defenders of the public health. This disease, known for many centuries in Europe, was recognized in New England in 1768. In 1908 it was prevalent in the eastern half of the United States and occurred in rare instances somewhat further west.²

In a recent article Black and Powers describe a small outbreak of rabies among the dogs of Los Angeles in 1898.³ Fortunately the disease was suppressed by a muzzling ordinance. In the same article are the reports of a fatal human case which was infected in 1899, from a dog in Pasadena, and of an outbreak in 1906 among the animals at the Soldiers' Home near Los Angeles. With these exceptions we have no authentic record of the existence of rabies in California previous to the summer of 1909, when the present epizootic first attracted attention in Los Angeles.

The disease may have been slowly carried to the state from the east by dogs and wild animals, such as coyotes and skunks, or it may easily have been introduced through the transportation over the railroad of an infected dog during the incubation period of the disease. It is only to be wondered at that the westward spread of the disease from the Atlantic to the Pacific seaboard required more than a century.

The spread of rabies through railroad transportation is well shown in the story of a dog whose head was sent from Imperial to the State Hygienic Laboratory, where examination proved the presence of rabies. This dog was the pet of a school teacher and accompanied her on a visit to Los Angeles, which is nearly two hundred miles from Imperial. A few weeks after returning, the dog suddenly became frenzied and killed fifteen chickens, but did not

bite any human beings or dogs. No other cases have occurred in Imperial, and it is highly probable that the dog had become infected during his unwise visit to a city in which rabies was prevalent. The traveling of dogs to and from infected districts ought certainly to be discouraged if not strictly prohibited by law.

The spread of the disease by wild animals is well illustrated by the first case reported in Oregon of the biting of a person by an animal suspected of rabies. In November, 1910, a child was bitten by a coyote showing symptoms suggesting rabies. The coyote was destroyed before its head could be secured for examination, and the child was given the Pasteur treatment without further evidence. A few weeks later a sheep and a pig which had been bitten by the same coyote developed rabies and their brains showed Negri bodies. I am indebted to Dr. Calvin S. White, State Health Officer of Oregon, for information regarding this interesting case, which shows that Oregon, as well as California, has been reached by the westward march of the disease.

The responsibility of the wild animals of California for the spread of rabies has not been clearly demonstrated. The tales of probable infections from skunks and from a mountain lion, were all, as far as I have been able to learn, unconfirmed by laboratory evidence. It is desirable that the heads of wild animals which display paralysis or ferocity unusual for their kind should be sent to the laboratory for examination in order that it may be definitely known whether these animals are playing a part in the perpetuation and spread of rabies.

The principal object in presenting this paper is to bring together for the use in the campaign against rabies a collection of reliable statistics with clear differentiation between fact and inference. The need for the dissemination of knowledge concerning rabies is indicated by the continued opposition to efficient measures for the eradication of the disease. Surprising as it may seem, the people most affected, namely the owners and lovers of dogs, through bitter opposition show a lack of appreciation of the fact that their pets are the chief sufferers from this terrible disease, as well as the means of its spread and transmission to horses, mules, cattle, pigs, sheep and human beings.

In order to combat successfully the usual opposition to the enforced muzzling of dogs, health officers should arm themselves with facts rather than opinions. To gain proof of the presence of the disease a laboratory examination of the suspected animal is imperative. A prompt and decisive laboratory examination becomes of greatest importance in those cases where human beings have been bitten, and where the patient is unwilling to spend the necessary money and time for treatment unless the need is clear. In such cases a positive report usually results in prompt and successful preventive treatment. If the report is negative, the patient is freed from the haunting fear that at any time in the ensuing months he may suddenly develop serious symptoms. Where dogs have been bitten by rabid animals, a positive laboratory report determines the advisability of having the dogs killed. It is unwise to keep infected animals about as they are apt to develop symptoms unexpectedly and spread the disease to others. The danger of keeping under observation and confinement horses or cattle which have been bitten by rabid dogs is not so great.

The routine examination of heads at the State Hygienic Laboratory consists of the careful removal of the brain, the making of smears from the hippocampus major, staining with Williams' modification of Mann's method,⁴ and careful search of from one to twenty preparations for Negri bodies. If the results are negative, one or two experimental animals, usually rabbits, are inoculated subdurally with an emulsion of the brain. If diagnosis is urgent, a guinea pig is inoculated, since that animal shows a very short incubation period, frequently only ten days.

In drawing conclusions from the laboratory sta-

tistics presented in this paper it must be borne in mind that the great majority of rabid animals are not examined in the laboratory. The opinion has been published⁶ that in Los Angeles not one case in ten has been reported to the Health Department. In that city 174 cases were reported between September, 1909, and April, 1911. During the same time fifty-nine positive examinations of heads from Los Angeles were made in the city laboratory. This means that approximately one-third of the reported cases received laboratory confirmation. From these statements it seems probable that the positive laboratory examinations represent less than one-twentieth of all the cases of rabies. In Stockton the proportion is more striking. We have the statement of Dr. Charles Keane, State Veterinarian, that one hundred cases have occurred in and near Stockton. According to our records only three heads were sent to the State Hygienic Laboratory from Stockton. These instances show that the laboratory statistics represent only a small fraction of the total number of cases.

In the State Hygienic Laboratory between November 2, 1909, and April 1, 1911, a period of seventeen months, the heads of eighty-two animals were received. Two of the heads could not be examined owing to decomposition; thirty-six gave negative results. Of the remaining forty-four showing positive results, thirty-six showed Negri bodies and the other eight caused typical symptoms of rabies in rabbits. One of these eight heads could not be examined for Negri bodies owing to decomposition, but the brain material was used for inoculation after the activity of the putrefactive bacteria had been inhibited by emulsifying with glycerin and allowing the mixture to stand for over twenty-four hours. This substance when injected deeply in the neck caused typical symptoms of rabies to appear at the end of fourteen days. Of the forty-four positive cases, one was a cat and another a cow. The forty-two dogs examined were known to have bitten at least twelve human beings, the majority of whom received Pasteur treatment promptly. Eight of the dogs were stated to have bitten other dogs, one of them biting fifteen or twenty dogs and another biting two dogs and a mule.

The laboratory of the Los Angeles Health Department presents very interesting statistics of the present epizootic. Between September 14, 1909, and April 1, 1911, this laboratory examined 104 heads, 97 of which came from the city of Los Angeles. One of the heads could not be examined owing to putrefaction. The sixty-four heads giving positive results were divided among the various animals as follows: Fifty-nine dogs, three horses, one cow and one goat. The first five examinations in 1909 were made by inoculation of experimental animals. Since then the results have depended on microscopic search for Negri bodies alone. The horse and eleven of the dogs which proved to be rabid were reported to have bitten human beings.

The laboratory of the Health Department of Long Beach examined the heads of four dogs between July 1, 1910, and August 11, 1910, and found Negri bodies in each case. Two of these dogs had bitten human beings who received Pasteur treatment. All four were found in Long Beach.

In the pathological laboratory of Dr. Stanley P. Black in Los Angeles, between December 10, 1909, and April 1, 1911, the brains of fifty-seven animals and two human beings were examined. In both the human cases Negri bodies were found, and in one of them animal inoculation was performed and resulted in confirmation of the diagnosis of rabies. Of the fifty-seven examinations of animals' brains fifty-two revealed Negri bodies and were therefore positive, four were negative, and one was doubtful. In one of the cases animal inoculation was performed and resulted in rabies, confirming the positive diagnosis based on finding Negri bodies. Of the fifty-two animals' brains giving positive results, forty-seven were from dogs and five from cats. Thirty-seven of these rabid dogs and all five of the cats had bitten

human beings. The heads came from the following counties: Los Angeles, Orange, San Bernardino and Kings.

Summing up the evidence of the four laboratories we find that out of 247 examinations of the brains of animals for rabies, 164 gave positive results. One hundred and fifty-two of the positive cases were dogs and the remaining cases were distributed as follows: Six cats, three horses, two cows and one goat. At least sixty-eight human beings were bitten by the animals which were proved to be rabid by laboratory investigation. If our previous estimate that not more than one out of every twenty cases of rabies in animals is examined in the laboratory, is true for the whole state, these positive cases would indicate that there had occurred a total number of cases in California of over 3200.

The Director of the State Hygienic Laboratory requests that, if any pathologist making examinations for rabies has been overlooked during the compilation of these figures, he will kindly furnish his totals to the laboratory in order that the statistics compiled may be kept up to date.

The geographical distribution of the cases is graphically shown on the accompanying map. In addition to the dots and circles which indicate the locality from which the heads of rabid animals were sent to the laboratories, and the figures indicating the number of heads from each county, small crosses may be seen. These represent, as nearly as could be ascertained, the locations at which fatal human cases of rabies became infected. The first case antedates the present outbreak.

A summary of the human cases follows:

1. On March 10, 1899, in Pasadena, a man (H. M. S.) was bitten in the face by his dog. Five weeks after the infection symptoms of rabies appeared, and five days later the man died (April 30, 1899). Inoculation of rabbits with the brain tissues of the patient produced rabies.⁷

The remaining cases all belong to the present outbreak.

2. On December 12, 1909, a rancher (M. E. C.) aged 30, died of rabies at Holtville, Imperial County. This man was infected through the bite of a cat.

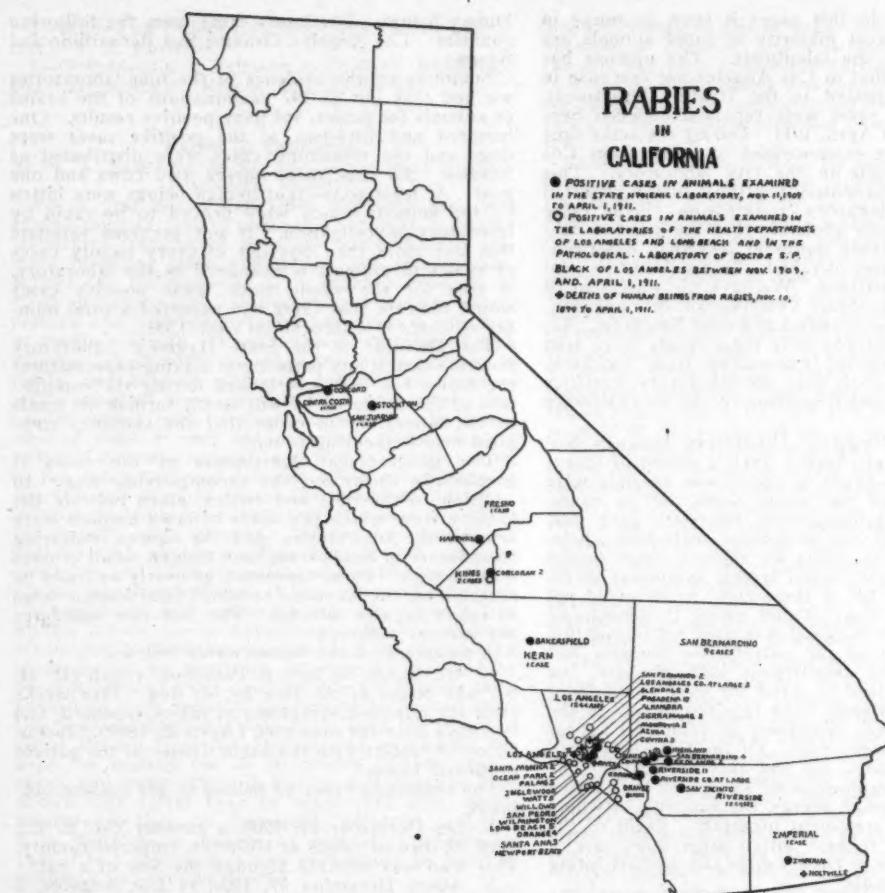
3. About December 17, 1909, in Los Angeles, a boy (J. S.) aged 10 years, was bitten in the leg by a stray dog. Nine weeks later symptoms appeared and death came three days afterward (February 21, 1910). Negri bodies were found in the brain of this patient.⁸

4. On May 2, 1910, a rancher (J. B.), aged 62, died of rabies at Rivera, Los Angeles County. He had been bitten in the face by his own dog.

5. On November 15, 1910, in Los Angeles, a girl (E. L.) of 6 years was bitten through the lip and on the nose by a dog. Intensive Pasteur treatment was instituted the next day, but symptoms of rabies appeared sixteen days after infection and death occurred two days later (December 2, 1910). Negri bodies were demonstrated in the child's brain.⁹ A rabbit inoculated with some of the brain tissue showed the paralyses of rabies on the nineteenth day.

The last of these cases was a patient of Dr. David D. Thornton of Los Angeles, and with his consent I will present a short account derived from the full report which he sent me:

In the morning of November 15, 1910, a little girl of six years was sent by her mother to a neighboring grocery store. While she was in the store a small, wet and dirty dog entered and sprang upon her, biting through her upper lip and scratching her nose with his teeth. The dog then bounded through the door and ran away. Later in the day the same dog bit another child in the leg, about a mile from the store where Dr. Thornton's patient had been attacked. The dog was examined in the Los Angeles City Laboratory and Negri bodies were demonstrated. The next morning, thirty hours after the biting, the Pasteur treatment was instituted by Dr. Stanley P. Black and was continued systematically through November 30, the fifteenth day



of the treatment, when the little girl was noticed to be peevish and irritable. On the way home from the doctor's office her mother bought her some soda water, but the child complained that it tasted hot. On setting the glass down on the counter a sudden jerking of her hand overturned it and she became alarmed and cried violently. On reaching the street she became nauseated and vomited, and later she had another severe crying spell. As she seemed ill, she was put to bed. Food was repugnant and she ate no supper. During the night the child awakened at intervals and talked rapidly. At midnight she asked for a drink of water and the mother observed that her daughter had some difficulty in swallowing. The following morning the child awoke as usual, and asked for water. Upon attempting to drink she experienced great pain in her throat and was unable to swallow. She became very irritable and extremely sensitive to noises. A window shade slipped from her mother's hand and went up with a sudden noise. This excited the child so that it could not be quieted for a long time. In the afternoon she rolled from side to side in bed and spoke rationally although she had been delirious at times during the day. The mere suggestion of drinking seemed to produce pain and there was fear of being touched or handled in any manner. The pupils were dilated. Chloral and bromides were given by rectum in an attempt to quiet the child. At about two o'clock in the morning she began having one convolution after another. The pupils were dilated, the pulse was rapid, and signs of exhaustion were apparent. Chloroform inhalations gave only temporary relief. Any slight irritation as wiping the saliva from her lips would precipitate a convulsive

seizure. The convulsions grew weaker and weaker and further apart until death ended the suffering at six o'clock in the morning.

This case is a striking example of an extremely short incubation period, due in large part to the nearness of the wound in the face to the central nervous system. About two-thirds of the Pasteur treatment had been given and consequently the immunity was far from being established. Usually the incubation period is between forty and seventy days, which allows sufficient time for immunization.

In order to prevent the recurrence of these horrible cases of rabies in man until the disease shall have been eradicated among dogs, it is necessary that the Pasteur treatment should be given as promptly as possible wherever a patient has been bitten by an animal proved to have had rabies or strongly suspected of the disease. The importance of treatment is apparent to any one who considers that approximately fifteen per cent of all untreated persons who have been bitten by rabid animals develop the disease and die, while only 1.3 per cent of those treated die.¹⁰ Almost half of the failures are in cases like one of those reported above, where the nearness of the wound to the central nervous system and the virulence of the infection so shortened the incubation period that there was insufficient time for the Pasteur treatment to establish an immunity before the onset of symptoms.

An example of very short incubation periods in animals has come recently to the attention of the State Hygienic Laboratory. A man living in one of the suburbs of Los Angeles reported to the laboratory that on November 24, 1910, his pet dog had

been bitten in the inner corner of the eye by a strange dog or coyote. Fourteen days later the dog became restless and the next day it was excessively playful and noisy. It refused to eat or drink, and it bit the man and his child on their hands. The dog died the following morning causing suspicion that it had been afflicted with rabies, and its head was sent to the State Hygienic Laboratory in Berkeley. Pending the arrival of the head, the Director of the Laboratory, influenced by the history of the case, telegraphed that he advised beginning treatment without delay. The Pasteur treatment was begun immediately. The dog's head was carefully examined but Negri bodies were not found. A rabbit was inoculated subdurally and in nine days it came down with typical symptoms and it died three days later. Negri bodies are said to be better developed in the slower cases, and in the rapidly developing case of this dog they were not discovered. In this case, the dog received a particularly virulent inoculation in a situation which permitted a quick spread of the infection up the nerves through the short distance between the eye and the brain. Usually the incubation period in inoculated rabbits is seventeen days or more. Dogs who have become rabid from bites usually have an incubation period of from fifteen to sixty days. Fortunately there was no delay in the treatment of the people bitten.

Those who have observed the symptoms of rabies in human beings, the anxiety and mental excitement, the painful spasms of the throat preventing swallowing, the convulsive seizures, and the final paralysis, are impressed with the horror of this agonizing disease. Inasmuch as the individual who has been bitten is seldom to blame, it seems only right that the community which has failed to suppress the disease among dogs should do everything within its power to enable the human victims to receive Pasteur treatment promptly and with moderate expense. I am of the opinion that there should be at least one place in California where a salaried officer of the state will administer the Pasteur treatment for a moderate set fee. This will not prevent the treatment being given by physicians to patients who desire to be treated at home and prefer to pay a higher fee, rather than to interrupt their work and travel to the Pasteur Institute of the State Hygienic Laboratory, wherever the State Board of Health might see fit to establish such an institution. An Institute is needed immediately for the administration of the free virus furnished by the United States Public Health and Marine-Hospital Service pending the beginning of the production of our own virus as soon as such a course will seem wise. The demand for Pasteur treatment is indicated by the fact that the Hygienic Laboratory of the United States Public Health and Marine-Hospital Service sent, previous to April 1, 1911, the virus for 141 Pasteur treatments to California. In addition to this virus the material for many treatments has been obtained by physicians of California from other sources.

Most of the cases given in California have been administered by Dr. Stanley P. Black and Dr. D. D. Nice of Los Angeles, who have kindly furnished me with brief reports of the extent of this work.

Dr. Nice has treated twenty cases of which three came from Arizona, where they had been bitten by skunks. No reports of rabid skunks in California have been received and it is to be regretted that the heads in the Arizona cases were not examined. Seventeen of Dr. Nice's cases came from Southern California; sixteen of these were bitten by dogs and the remaining case received the saliva of a rabid cow in a cut of the hand. Eleven of the dogs showed Negri bodies on examination and the remaining animals were not investigated in the laboratory. None of the twenty cases developed rabies. Treatment was begun from one to six days after the bite, except in one case when it was instituted eleven days after.

Dr. Black has given Pasteur treatment to 102 peo-

ple from Southern California. Most of these patients came from Los Angeles, San Bernardino and Orange counties, but one came from each of the following: Kings, Riverside and Ventura. Dogs were the source of infection in 93 of the cases, cats in 5, horses in 4. The diagnosis of rabies in the infecting animal depended on the discovery of Negri bodies in 77 cases (73 dogs, 3 cats, 1 horse), and in two additional cases on animal inoculation. One of the cases showing Negri bodies was confirmed by inoculation. The remaining 23 infecting animals (18 dogs, 2 cats, and 3 horses) were considered rabid owing to symptoms which they presented, or to the circumstances of the biting. The great majority of the people treated had been bitten, but in a few cases the virus had entered wounds otherwise inflicted. Three physicians took the treatment after receiving wounds while making post-mortem examinations of rabid animals. One of the 102 patients died of rabies long before the treatment could be completed, as has been already reported in this paper, and therefore this case cannot be looked upon as a failure of the method. Another patient showed some paralysis. With these two exceptions, no symptoms, in any way referable to rabies developed during or after the treatment. The time elapsing between infection and the beginning of treatment averaged 5.7 days.

In Berkeley treatments have been given since November, 1909, by the writer to a helper in the State Hygienic Laboratory, who cut himself while opening the skull of a rabid dog, and also to a boy who was bitten by a rabid dog in Concord, California. This dog's brain showed Negri bodies. Neither case showed any symptoms.

A man who had been bitten while visiting in Missouri by a dog suspected of rabies, received treatment in San Francisco from Dr. Raymond Russ.

There are many persons who do not understand the best procedure to be followed when a person has been bitten by a dog suspected of rabies. The animal should be captured, if this can be safely done, and should be shut in a pen where he should be well cared for during a period of ten days. If the animal is alive and well at the end of that time, rabies may be excluded. If the dog dies, or if it is killed at the time of the biting, the head should be carefully removed by a physician or veterinarian, should be packed in ice in a large can or bucket, and should be sent by express to the State Hygienic Laboratory, Berkeley. The wounds inflicted on the person bitten should be promptly cauterized with nitric acid by the nearest physician. If there is little doubt of the presence of rabies in the dog, or if the wounds are about the face, there must be no delay in beginning Pasteur treatment. Otherwise it may be safe to wait twenty-four to forty-eight hours for a telegraphic report of the microscopic examination of the laboratory. All dogs and cats bitten by rabid dogs should be killed, for they would be apt to spread the disease should they develop it. As soon as it is known that the disease is present in the community, the health authorities should be notified and support should be given to the establishment and enforcement of ordinances compelling the destruction of ownerless dogs and the muzzling of all dogs until six months after the disease will have disappeared. If a neighboring community contains rabies and is not properly handling the situation, steps should be taken to prevent dogs from entering from the vicinity where rabies prevails.

The proper application of the precautions which have been outlined will diminish rabies to a minimum, and possibly entirely free our state from the disease. This would prevent a great deal of suffering among dogs and cattle, and would annually keep a few human beings from the tortures of a horrible death.

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Discussion.

Dr. Wm. Ophuls: I have listened with interest to Dr. Sawyer's splendid presentation of the subject. I examined the cerebellum of a girl who was killed by a mountain lion in the Santa Clara Valley; the lion was suspected to have had rabies, but in spite of careful examination we were unable to discover Negri bodies in the brain. I have not known of any cases which occurred in San Francisco. At the hospital a few months ago we had a dog which behaved as if he had rabies, but it turned out that our fears were without foundation of fact. Certainly sooner or later the disease is going to come to San Francisco, and it would be better to take time by the forelock and prepare an ordinance and enforce it in case of need.

Dr. W. A. Sawyer: The geographical distribution of the disease is interesting. Around Los Angeles, where the population is crowded and where there are many dogs, the disease is found prevalent over a fairly large area. Around San Francisco Bay, where the disease has not yet broken out, there is a distinct need for the authorities to prevent the disease from slowly working its way into that densely populated region. Over a year ago the disease was in Stockton and a single case has been found as near as Concord. If we can only keep rabies from getting into the Bay region we will be doing a distinct service to that community.

Automobile Accidents from Detachable Rims.

By M. L. EMERSON, M. D., Oakland.

All these accidents occurred during the year 1910-1911. Dr. Larkey wishes to refer to the following experience:

While coming down the Piedmont hill, in his automobile, he heard a hissing sound evidently coming from one of his rear tires. On reaching the bottom of the hill he stopped and got out to inspect the tire. When within two feet of the wheel a blow-out occurred, followed by a loud report, knocking off the detachable rim which flew into the air about twenty feet high and landed about one hundred feet from the car.

Dr. Wm. Channel wishes to report the following case: While waiting to have his gasoline tank filled in one of the local garages, his attention was called to a mechanic, who was pumping up a deflated tire with a large double lever hand pump. A hissing sound attracted the doctor's attention, also the mechanic's, who stooped down beside the wheel trying to detect the air leak, when suddenly the inner tube blew out, knocking off the detachable rim, striking the mechanic sideways on the hip, shoulder and left leg, knocking him down and over the pump he was using. The leg injury consisted of a severe bruise over the tibia.

I wish to report the following cases: Dr. I., a local dentist, consulted me concerning a bruise over his left tibia. He stated that two days ago he had inflated a tire on his automobile, using the ordinary single piston hand pump. After completing the same and while placing the screw cap on the valve, the inner tube blew out, knocking off the detachable rim with great force, striking him on the leg and shoulder, knocking him against the side of the garage a few feet away, from whence he fell to the floor, dazed but not unconscious. The doctor stated that at the time of the accident he had on a very

heavy automobile coat, which must have saved him from a more severe injury, as the force of the blow was tremendous.

Mr. O., local tire dealer, consulted me regarding an injury to his forehead, stating that after inflating a 34 by 4 tire with eighty-five pounds pressure, and while adjusting the cap on the air valve, the inner tube blew out simultaneously with the loosening of the detachable rim. The force of the blow from the air, he said, was like being hit on the side of the head with a beer mallet. The detachable rim struck him on the forehead, shoulder and right knee. He was in a squatting position and on attempting to rise and sustain his balance, he took two or three steps backward, finally falling on his back between the middle car tracks, the tire going on over his head to the other side of the street. He was temporarily dazed by the blow but not by the fall. I found a huge welt on his forehead with a distinct marking of the rim where it had made its impression on the skin. The skin was not lacerated. I could find no fracture. A year ago the same patient had a similar accident from a quick detachable rim, hitting him over the left eyebrow, causing a black and blue swelling which remained ten days. There was no scar with either injury.

On October 21, 1910, Mr. H. J. T., an automobile mechanic, was admitted to the surgical department of the Merritt Hospital. He was unconscious and comatose. Four weeks previous, after inflating an automobile tire with compressed air and while adjusting the valve cap, the detachable rim blew off the tire, accompanied by a blow-out of the inner tube. The patient was kneeling on both knees with his head bent forward, about twelve inches from the wheel, and got the full blow of the rim flat across his forehead. He was knocked unconscious, falling forward alongside of the wheel. In this condition he was removed to a nearby sanatorium, where a compound fracture of the frontal bone was discovered, with concussion of the brain. A central piece of protruding bone was removed, some other depressed fragments elevated and drainage established. In a few days consciousness returned, and in three weeks the patient left the hospital, not well, but able to walk around. A few days following severe headaches supervened and a drowsy and later a comatose condition followed. In this condition I first saw him. Comatose but able to be awakened occasionally to take liquid nourishment with considerable effort at swallowing. Pulse 78, temperature 104°, respiration 12. Dilated pupils, chocked discs. Diagnosis, compression of brain, meningitis. Operation. I made a large frontal flap, turning the same down over face, which revealed a multiple fracture of the entire frontal bone, some fragments depressed and bathed in pus. A number of these were removed, others elevated and the surface of the dura cleansed. I could determine no abscess and but little pus exuded from a small opening of the dura. The patient died nine days after entering the hospital, never regaining consciousness or showing any improvement. Dr. LeRoy Briggs, autopsy surgeon, reported diffuse suppurative meningitis. Staphylococci; no abscess.

In every instance the accident occurred by a defect in the locking device for holding together the two ends of the detachable rims. Either the tie screw was worn or had not properly engaged or was knocked loose by banging on the rim with a heavy hammer.

"Demonstration of Application of Plaster Jacket for Curvature of Spine."

By JAS. T. WATKINS, M. D., San Francisco.

Before proceeding with our demonstration I want to impress upon you that it represents but a single feature in the scheme of treatment for spinal curvature. The rest of the broad subject of treatment will not be discussed by me. Neither the importance of prolonged recumbency on the curved gas-

pipe frame nor the relative value of different exercises, nor the use of the Lange scoliosis press, nor Lange's pelvic and shoulder girdle distortions apparatus, nor a number of other matters can properly be considered here and now. All that I aim to do is to demonstrate to you the priceless value of the Wullstein apparatus as an aid in the attempt to solve the mechanical problems presented by a distorted spine. Its uses, abuses and limitations and whatever criticism you may have to make of my introduction would be proper subjects for subsequent discussion.

I think I will not be more than four minutes recapitulating in outline the unsatisfactory little that we know about scoliosis.

First: Causation. No theory has thus far been formulated which can be made to account for even a majority of the cases we see.

Second: Mechanics. Broadly speaking, it may be said that spines obey the laws governing flexible rods, undergoing the same changes of form that these do when they are subjected to identical stresses. There is reason to believe that we have not yet recognized and recorded all of the stresses to which spines *in vivo* are subjected. Also when a portion of the spine becomes fixed it ceases to respond to external influences as do the mobile portions. It ceases to be a flexible rod.

Third: Treatment. Lateral curvature is a compound distortion, the result of several complex movements.

The lack of success which has attended efforts to forcibly correct scoliotic distortions in the past must be attributed, at least in part, to failure to recognize and control all the factors; that is, all the twists and bends, whose sum is the compound distortion which we term spinal curvature. We have to be prepared to correct, both in the thoracic column or in the lumbar column or at this junction, side bendings, forward and backward bowings, right and left twists and various combinations of all of them.

The attempt has to be made to straighten a bent and twisted rod, the middle segment of which is, in the cases which call for forcible correction, oftenest fixed and inflexible and presents the maximum distortion. This middle rigid segment of the spine is separated by reversibly distorted or perhaps hyperflexible segments, from the two ends—that is, the head and pelvis, where alone the spine may be grasped. For the rest, the spine may only be approached from one side, that is, behind, and finally the attempt to exert a thrust upon the apex of the distorted segment must be made indirectly through the ribs which are movable upon the spine itself.

Turning to the Wullstein machine, if for purposes of demonstration we assume that we have to do with the usual S-shaped type of scoliosis, we find three means of proceeding against the exaggerated forward bend in the thoracic segment: (1) simple traction; (2) hyper-extension over head; (3) thrust of the pressure pad on apex of curve. The exaggerated backward lumbar distortion is flattened (1) by seating the patient; (2) by simple traction; (3) by sliding the seat backward against the fixation obtained with the pressure pad.

The torsion and comparatively slight side bending in the dorsal column is attacked by (1) pure traction; (2) the shoulder straps; (3) the thrust of the pressure pad.

The torsion and marked side bending in the lumbar column is attacked (1) by the rotation of the seat on a longitudinal axis; (2) by the tilting down of one side of the pelvis; (3) pure traction.

A counter pressure pad may be placed over the prominent ribs in front.

Treatment of Bone Tuberculosis at the Children's Hospital.

By GEORGE J. McCHESNEY, M. D., San Francisco.

The purpose of this paper is to give a brief account of the present technic of treatment of cases

of spinal, hip, knee and smaller joint tuberculosis at the Children's Hospital.

Of course I can only speak authoritatively for the work done on Dr. Sherman's service, but the other half year's under Drs. Hunkin and Crane does not differ essentially, as far as my observation goes, and what differences in treatment there are, they will doubtless tell you.

I will not try to support my belief in our present mode of treatment by complicated statistics. I will say, however, that nowadays our cases (except those far advanced on admission) unvaryingly run a mild course and that no radical life-saving operations are necessary, whereas a few years ago we always had under our care some desperately ill cases, which would often necessitate the removal of a joint, or a limb, to save life.

Excessive temperatures in the "Little Jim" ward nowadays are due to other causes than the tubercle bacillus, and night cries are very rare. The principal reasons for this improvement are two: first, improved methods of resting and immobilizing affected joints; second, ultra conservatism in the use of the knife. I shall amplify these two reasons in discussing the treatment of individual joints.

First: Tuberculosis of the Vertebrae. As we all know, the infection usually attacks the anterior or ventral part of the intervertebral discs and bodies of the vertebrae, and the body weight then crushes the spinal column anteriorly, and forms a knuckle of bone, or kyphos, posteriorly. This is combated by recumbency in hyperextension on a curved gas-pipe frame. This position removes the body weight and thus releases from pressure the diseased parts of the vertebrae. This we are now supplementing by the wearing of a plaster of Paris jacket with Calot's method of making openings in the jacket over the kyphos and the insertion of felt pads every two or four weeks, making a gradually increasing direct pressure upon the kyphos up to the point of toleration. This aids the hyperextending tendency of the curved stretcher and affords much more immobilization, lessening considerably even the excursion of the vertebrae caused by respiration, and the traumatism consequent upon it. It is yet too soon to judge from our results but Goldthwait in his "Diseases of Bones and Joints" concerning the Calot treatment, says, "By this method when final consolidation takes place, although new bone does not replace that destroyed, the bodies fuse, the spinous processes are crowded together, instead of being bent apart, and while above and below the seat of the old kyphos, there may be found slight concave compensatory curves, the kyphos as such is not evident."

This jacket treatment is continued of course after the child is allowed up. So much for a general outline of the treatment which in some form extends over a period of from two to six years, recumbency occupying roughly a third of the time.

The cold abscess is the principal complication, and is let absolutely alone, except retropharyngeal and retromediastinal abscesses which are very rare.

In this, I may be more enthusiastic than the other members of the orthopedic staff, but I am convinced that the chances of secondarily infecting the cold abscess (a serious and sometimes eventually fatal accident) are greatly increased by incising or even aspirating it. It is interesting to note how large an abscess may become and not interfere with the general health of the patient, but once in awhile it causes discomfort by pressure and then only should aspiration be resorted to. Usually it breaks through the skin, and then Nature's ragged tortuous opening seems to me admirably adapted to combat the entrance of secondary infection, provided always that we do not meddle with her defenses in trying to hurry the flow of pus by manual pressure over the abscess. This is a mistake, for, when the pressure of the hand is released, the abscess wall expands, air is sucked in, and with it air-borne infec-

tious germs, which find an ideal culture medium, and no resistance in the surrounding tissues.

Our technic, when the abscess ruptures, is to allow it to flow out absolutely undisturbed into sterile gauze dressings, which are changed every three to eight days, depending upon the tendency of the skin to excoriate, but trying always to make these necessary exposures to the air and other modes of contamination as infrequent as possible. When following this "let alone" policy, it has invariably been noted, that the volume of discharge quickly dwindles to a minimum, no constitutional symptoms are noticed, and the abscess ceases to be a cause of trouble, although a minute discharge may persist for months.

A striking example of the advantages of this mode of treatment was presented in the case of a cold, painless abscess the size of half an orange in the postero-lateral aspect of the knee joint, in a case of knee tuberculosis. The skin was thin and reddened and rupture was evidently not far off. I sterilized the skin, applied a voluminous sterile dressing and immobilized the knee in a plaster splint. Six weeks later I changed the splint, found dried discharge in the gauze dressing, a dry crust over the mouth of the sinus, and no abscess. The boy had been perfectly happy the whole time and when it ruptured we could not determine. Even odor was lacking, there being no secondary infection, a mild type of which may cause pronounced odor, and is always due to too much handling. When an infection severe enough to cause constitutional symptoms occurs, the odor may be slight or absent, but the amount of discharge is the reverse.

Aspiration is justified occasionally as when there is discomfort or pain from pressure of pus. I have never seen its absorption cause constitutional symptoms. On the other hand, the risk of infection, terror and pain to the child, plugging of the needle with slough, are each good reasons for refraining from a procedure which benefits so little.

Second: Tuberculosis of the Hip. Here resting and immobilizing the joint are of supreme importance. Rest or cessation of weight-bearing is easily obtained by crutches and high shoe on the well side, but immobilization sufficient to control joint friction and irritation, can only be obtained by the careful application of a snug fitting plaster of Paris spica. After years of experimenting with various kinds, we have found that it must extend from a little above the ankle to the ensiform cartilage, with the limb in a position of hyper-extension or full extension and 15 to 20 degrees of abduction.

This position, first adopted as a routine procedure as far as I know, by Dr. Hunkin, stretches and places at a mechanical disadvantage the iliopsoas and adductor muscle groups which are the chief offenders in the production of the muscle spasm, and subsequently of the classical deformed position of untreated hip disease, and also it firmly places the head of the femur against the Y ligament, and front of the capsule and acetabulum, and assists greatly in producing immobilization, which is all a spica tries to do.

All cases of hip disease, new and old, are put at once into this position in plaster of paris spicas. Usually an anesthetic is required to relax the muscular spasm, before the desired position can be obtained, but even in the worst cases only two or three nights of discomfort follow, and night cries are seldom heard. Since adopting this method of treatment, abscesses have not developed in the fresh cases, and invariably in advanced cases the progress of the disease has been arrested. Abscesses here have the same treatment as the spinal abscess, i. e., complete conservatism. If the abscess ruptures, well and good, it finds an aseptic skin and sterile gauze dressing waiting for it which, to minimize the chances of secondary infection, will be changed as infrequently as possible.

I claim again, that in a fairly large series of hip joint tuberculosis in the last year, comprising about 34 in hospital and private practice with Dr. Sher-

man, every case has had an uneventful course, and gives promise of a relatively quick recovery with a minimum of damage to the affected joint, and a fair range of motion. This, however, does not include the cases presenting themselves for treatment, where the disease has advanced so far that the best result obtainable is a complete bony ankylosis. A recovery with a hip joint fixed permanently in the position I have described of 15 to 20 degrees abduction, and full extension, is not the most desirable, principally because the sitting position is impossible, except on the edge of a chair, with the affected limb awkwardly outstretched. The gait also is not as good as when there is 20 to 25 degrees of flexion of the limb with an abduction of the same amount. Consequently, limbs, where the active process has subsided, and little or no motion is present, are placed in this position, instead of the one I have previously described for cases where joint irritation is present.

In knee joint tuberculosis, the same general plan obtains—first rest, by the cessation of weight bearing, usually by means of the Thomas walking brace. Second, immobilization by a plaster splint. This can only be done with the tibia fully extended on the femur, i. e., forming a straight line with it. Usually some flexion deformity has already occurred, and this can be overcome, either by gradually wedging the posterior two-thirds of a splint apart, on the anterior one-third as a hinge at the knee, taking several sittings to do it, or doing it all at once, by the Whitman method, which is to extend the femur on the tibia, the anesthetized patient lying prone. Of the two methods, I prefer the former, as the traumatism to the joint is less and an anesthetic is avoided. In either case, immobilization is not perfect until the more powerful flexor muscles are put at a mechanical disadvantage by separating their origins and insertions, as far as possible, as in hip disease. The necessity for haste, however, is not as great, as usually the first splint controls the pain. Abscesses are treated here in the same way as are those of hip and spine.

Not many cases of smaller joint tuberculosis are treated in the hospital, being usually referred to out patient clinics, but the same general rules laid down above are followed here and with as much success.

Sever of Boston in a recent study of ankle joint and tarsal tuberculosis in comparing 100 operative versus 88 non-operative cases, claims less time of treatment and less resulting deformity in the non-operative cases.

There are cases, however, where conservatism must be laid aside and the knife resorted to immediately. I refer to tubercular abscesses in the bone near a joint with the joint not yet involved. Such cases are rare, but do occur, and can be diagnosed only by aid of the X-ray. Here early evacuation of the abscess and curetting the cavity saves the joint. I have assisted in two such operations recently, in cases involving the lower end of the femur in children, and threatening the knee joint, and we are always on the lookout for a similar affection at the other end of the bone to perform the operation which Dr. Huntington has recently brought into prominence again. If, however, we consider the synovial membrane of the joint to be in the least implicated by extension of the process, operation is contraindicated.

Bismuth paste we now use only in single or multiple old chronic sinuses where the bone has healed and the discharge is at a minimum. We find it contraindicated, where the process is acute or the discharge profuse, although there have been a few cases where it has seemed to control a profuse discharge to a marked extent.

Other adjuvants in use are the Bier congestion and the tuberculin injections, but we do not consider their exact value as yet determined.

The general treatment for tuberculosis is of course most important, and we endorse the mandate of the municipal dispensary clinicians to "keep your win-

dows and bowels open." We have the windows open all the time, and consequently less work for the tonsil and adenoid operations.

It is our hope some day to take all these tubercular children to a hospital annex somewhere along the ocean beach, where they can be out of doors all day and breathe only the sterile air off the ocean. This has met with great success at Berck-Sur-Mer, in France and at the Sea Breeze Hospital on Long Island.

In conclusion, I wish to be plainly understood that this conservative plan of treatment applies only to children. Past the age of puberty the problem is quite different. But in all cases the battle is one of years, not months, the parents have to be slowly coaxed into agreeing with our patient waiting policy and for the orthopedist, at least, the "pay-as-you-enter" office is a dream of the future.

Discussion.

Dr. C. C. Crane: It seems to me that Dr. McChesney has treated the subject carefully, tersely and fairly. It is gratifying to know that the views of Drs. McChesney and Sherman, particularly in regard to the treatment of tuberculosis of the spine and hip, so closely coincide with the principles enunciated by Dr. Hunkin from whom I have received much and very valuable instruction. In the consideration of so important a subject such unanimity is most salutary. With regard to the prognosis in scoliosis it seems pertinent to lay stress upon a point which has not been too much dwelt upon. During the preliminary treatment of scoliosis when the stiffened areas of the spine are being rendered flexible and the correcting performances are being pursued the role played by the patient is mainly a passive one. Eventually, however, when the treatment by active exercises is begun, the patient assumes a more important role and it is at this time that the earnest and enthusiastic co-operation of the patient must be obtained and maintained if the happiest results are to be expected.

Dr. S. J. Hunkin: Dr. McChesney has covered the ground so very thoroughly that I feel there is but little left to be added regarding the part protection plays in the treatment of tubercular bone diseases. In hip disease I am glad to learn that Dr. McChesney is following the hyper-extension position for fixation. I have employed it for many years in the hip joint, and believe also I was the first one who insisted that it be done in the spinal cases. From my standpoint it is above any other plan offered. I look upon tuberculosis in the lumbar region as in the best possible position for cure without a deformity. I have thought that cases—perhaps get well quicker up in the cervical region, but it is more serious in that location. In my opinion the hardest place is in the upper dorsal region. This can readily be understood, for it is easy to throw the weight backwards where the normal curve is concave backwards, and hard where the normal curve is convex backwards, and as the more extreme posterior convexity is in the mid-upper dorsal, here the deformity increases most rapidly and is harder to control. I believe that it is as important to give rest to the spine in tuberculous conditions as it is in the hip joint, but I do not keep my patients so long in bed as Dr. McChesney's paper would lead one to suppose he does. If the child has the proper curve and we can easily maintain the superincumbent weight of the child posterior to its focus of disease, and there is no spasm, it is not put to bed at all but wears a jacket from the start.

Dr. Harry M. Sherman: As the hour is very late I am going to say but a very few words. Really I am most interested in speaking about the operative as against the non-operative method of treating these conditions. About twenty-five or twenty-six years ago I commenced working in San Francisco and began almost at once to treat bone and joint tuberculosis. I had been taught in Sayre's clinic mechanotherapy as it was then understood. It

seemed to me wrong to go on treating these cases by splints, braces, etc., when possibly operative procedure might cut everything short and save time and limb and life, often, however, at the sacrifice of a joint. I did a long string of excisions of all the joints,—of the hip, over one hundred. There were some most satisfactory results as regards life and limb but with loss of the joint; some of the patients were able to walk and to work, and one, who had had a hip excision, became a stevedore. We did not then know all we do now about asepsis and our antiseptic and aseptic technic was often faulty and some of the results were deplorable, joint and limb and life all being lost. Gradually I came back to the more conservative line of treatment and the more careful use of the traction splint which Taylor invented and Sayre popularized and which was perfected by being simplified by Judson as the New York Polyclinic hip joint splint. This, with a thoracic band added, is probably the best of the long traction splints, giving both immobilization and traction to control motion and intra articular pressure. What is true of hips in this story, in respect to operative as against non-operative methods is true also of knees and to a certain extent of ankles. The operative possibilities fascinated until the mischances made me study conservative methods more carefully. Then Lorenz came and told us about the plaster of Paris spica for hip joint tuberculosis. Before the visit of Lorenz I had not infrequently put a plaster of Paris spica on a hip patient but only as a temporary expedient while the instrument maker made a steel instrument; but after the visit I began personally to use more plaster of Paris instead of the traction splint, substituting immobilization alone for immobilization and traction. Finally Dr. McChesney came into the office, and gradually I turned over to him this phase of the work, particularly so far as the dressings were concerned, and then he began to go on beyond what I had taught him and took the plan of Dr. Hunkin, which includes hyper-extension and abduction. So far as this particular position is concerned I have this to say: The final test of its value will be the amount of bone destruction which occurs. If there is less bone destruction in this position, it is the position in which the limb must be put; if there is more bone destruction, it is not the position of choice. In hyperextension and abduction the femoral head is thrown forward against the anterior part of the capsule, pressing against an unstable point in contrast to the stable floor of the acetabulum. This does not seem to count for complete immobilization. Of course there is no traction at all. Perhaps it may be interesting to note that this is doing with tuberculous joints just what Robert Jones is doing in the case of fractures near to joints, putting them into a position quite opposite to that they would finally assume if left alone, and the philosophy of it for each may lie in this particular idea.

The other day there came into my office a man upon whom I had operated 17 years ago; the hospital record showed that I had cut down upon the trochanter and trephined it and had cut out the infected and softened cancellous tissue of the trochanter and neck but that I had failed to relieve or benefit the patient because the joint synovia was affected and it had to go on to excision. Excision was done first on one hip and then on the other. It was on this patient 17 years ago that I was working along these lines that Dr. Huntington is now advocating and this must have been one of the earliest cases of that character that I did. Now I have gone all the way around the circle, and how far I may go on a second lap I cannot tell.

Dr. George J. McChesney: If a child with spinal disease comes for treatment with a history of being more or less restless, does not sleep well and is nervous and irritable, we find that getting up in the jacket right away is not the best plan, but the child should be put upon the stretcher for prolonged rest. When the child gets fat, when it commences to be

lively and active, and the mother complains of the difficulty of keeping it on the stretcher, then we allow the child to be up in a jacket. I agree with Dr. Hunkin that the lumbar spine is much easier to treat than the dorsal. Dr. Sherman has said rightly that we have not carried these cases along far enough as yet. The final results will have to show themselves 15-20 years hence. In reference to the position of the head of the femur against the ligament and front of the acetabulum versus a possible more stable position in the center of the acetabulum. I think the more important factor is the overstretching of the flexor and adductor muscles and when they are out of commission the head of the femur takes care of itself.

SOCIETY REPORTS ALAMEDA COUNTY.

The regular meeting of the Alameda County Medical Association was held in the rooms of the association, 127 Telegraph avenue, Tuesday, May 16, 1911, at 8:30 p. m.

Vice-President W. A. Clark in the chair.

The program was given by the San Francisco Medical Society.

I. Appendix Dyspepsia—Dr. Wm. Fitch Cheney.
II. The Surgical Treatment of Uterine Prolapse—Dr. Harold Brunn.

The papers were exceedingly interesting and brought out a full and equally interesting discussion participated in by Drs. Emerson, Von Adelung, Hamlin, Crosby, Buteau, Adams, Makinson, Percy and Ewer.

PAULINE S. NUSBAUMER, Secretary.

CALIFORNIA ACADEMY OF MEDICINE.

The California Academy of Medicine held a regular meeting on Tuesday evening, May 22, 1911. The following scientific program was given:

1. A Preliminary Note on the Relation Between Rat and Human Leprosy, Dr. L. S. Schmitt. Discussed by Drs. McCoy, Canney, Cooper, Schmitt.

2. Charcot Joints, Dr. Leo Eloesser. Discussed by Drs. Rusk, Ophuls and Eloesser.

3. Demonstration of X-Ray Plates, Dr. George L. Painter.

Refreshments were served at the end of the program.

SAN DIEGO COUNTY.

The Physicians' Club of San Diego held its annual meeting on May 4th, in its rooms in the Timken Building. Substantial progress in membership and in acquisitions to the library were reported. The County Society now holds its meetings in the club rooms, and the two organizations are closely affiliated, membership in the County Society being the first requisite for membership in the club.

Officers for the ensuing year were elected as follows: President, W. A. Winship; vice-president, J. E. Jennison; secretary and treasurer, B. J. O'Neill; directors, V. G. Clark, I. D. Webster, F. Baker, R. Lorini and H. P. Newman.

On Thursday evening, May 18, the San Diego County Society and the Physicians' Club of San Diego entertained the medical officers of the Pacific fleet and of the troops now stationed here at an informal smoker at the University Club.

The guests were welcomed in short speeches by Dr. I. D. Webster for the Medical Society and Dr. F. R. Burnham for the Physicians' Club. Dr. Norton, fleet surgeon, responded on behalf of the visitors. Dr. T. L. Magee gave a short history of the founding and early days of the County Society. Various other short talks were given, after which the company adjourned to the dining-room.

Mayor Wadburn, of San Diego, has recently appointed the following physicians, all members of the San Diego County Medical Society, to fill vacancies on the City Board of Health: Dr. H. C. Loose, Dr. H. M. Wegeforth and Dr. B. J. O'Neill.

B. J. O'NEILL, M. D., Secretary.

BOOK REVIEWS

The Practical Medicine Series, Vol. II, General Surgery. Edited by John B. Murphy. Series 1911. Chicago, The Year Book Publishers. Linen. Price \$2.00.

An excellent compend of the year's progress in surgery. It may be heartily recommended to the general practitioner as a good succinct exposition of the present status of the surgical questions of the day, and to the surgeon as a ready manual of reference to the most important recent literature—one that will often save him a search among bulkier literary indices. The remarks and the expressions of personal opinion that the editor, J. B. Murphy, has appended to many of the articles, greatly enhance the value of the book.

L. E.

Principles of Therapeutics. By A. Manquat. Translated by M. Simbad Gabriel, M. D. Published by D. Appleton & Co., New York, 1910.

The author lays down principles to guide the young physician in the right direction. His ideals are the highest; he pleads at length for scientific therapeutics and decries the use of therapeutic measures which are based on imaginative theories. "When scientific therapeutics does not know . . . it says so; when it affirms, it proves; when it ventures a hypothesis, it makes reservations." A classification of therapeutic measures, based upon the objects to be attained, is discussed in one chapter. The groups he suggests are (1) therapeutics of disease, which includes specifics, anti-infectives (non-specific) medicines, antiseptics, antiparasitics, antidotes and eliminators; (2) organic and functional therapeutics; (3) symptomatic therapeutics; (4) reparative therapeutics. He makes the distinction between utilizable action and toxic action of drugs. That this is a practical division for the study of therapeutic agents is readily shown, as is also the difficulty in determining the influence such toxic and utilizable doses bear on the morbid organism.

In chapters devoted to "doses and medical opportunity," Manquat argues for the use of the smallest efficacious dose. "Except specific medicines, which require fairly large doses, there is advantage in the majority of cases, in prescribing doses considerably smaller than those usually recommended." His illustrations of the application of these principles are excellent. To read these chapters and that entitled "Primum Non Nocere," is to become conscious of the many problems which beset the practitioner in managing every case. Emphasis is placed on the necessity of individualization of treatment, as influenced by (a) the patient, (b) the organs and functional activities, (c) the nature of the disease, and (d) such reactions as tolerance and habituation. The influence of environment is discussed in its many aspects, not only are effects of temperature, light, climate, season and ventilation taken up, but some excellent advice is given in the subject of consultations and change of physicians. In summarizing the chapter on method in therapeutics, he says: "Therapeutic facts are extremely complex and difficult to establish. . . . The appreciation of the influence of a therapeutic measure is always derived from the idea that is formed of the diagnosis. In clinical observations the tendency to confuse facts, interpretations and opinions, is to be guarded against. Facts alone have scientific value. Numbers add less to the value of conclusions than does precision. Good statistics imply several conditions, the most important of which is the identity of the elements composing them. In the final chapter appears a list of drugs and other therapeutic measures classified according to his scheme. The author has written with force, a very readable book; one worth any physician's time. Its value is enhanced by the use of good paper, clear type and a most satisfactory arrangement.

P. C.

"Prevention of Infectious Diseases." By Alvah H. Doty, M. D., Health Officer of the Port of New York. D. Appleton & Co., New York. 1911.

In presenting his work on the prevention of infectious diseases, Dr. Doty has proven that many of the theories heretofore accepted are erroneous, and in fact "aid in the extension rather than the prevention of these diseases." The proofs adduced are in many instances the result of recent research in sanitary science, and are found for the first time in text-book form. Of particular value and interest is the discussion of fomites. Doty claims that the idea of disease being carried by clothing, bedding, cargoes of vessels, money, rags, etc., would long since have been shown to be a mistake, were it not for the fact that it offers an easy explanation of various epidemics, which careful and intelligent investigation might have traced to their proper source. The really important sources of infection are personal contact; mild, ambulatory, irregular and unrecognized cases; the so-called "carriers" who transmit the disease without showing any symptoms themselves; transmission through insects; and finally contamination of food and water supplies.

Following are a few of Dr. Doty's statements, differing to a greater or less extent from the older teachings: "Persons and not things transmit disease"; dirty rags and second-hand clothing do not carry disease; "cargoes of vessels do not act as mediums of infection and unless there is a specific reason for it, they should not be disturbed in instances where an infectious disease appears on board"; diphtheria, measles, scarlet fever and other diseases of this class are not disseminated by "clothing of well children in whose homes some form of infectious disease exists or has lately visited," but rather that school epidemics are due to the presence of mild or unrecognized cases, thus emphasizing the great importance of school inspection. "The real danger of transmitting infection, through the medium of the physician or nurse or others who are in charge of the case, is by the hands rather than the clothing."

Special chapters are devoted to the subjects of marine sanitation, smallpox, yellow fever, typhus fever, cholera, plague, disinfection, disinfectants, isolation of patients, the thermometer and the mosquito. Under the discussion of yellow fever a full account is given of the commission appointed by the President of the United States in 1900, to study that disease in Cuba, and of the history-making results attained by Drs. Reed, Carroll, Agrimonte, Lazear and their associates.

In the study of plague problems Doty believes the infected rat the chief cause of the spread of disease, still he believes it is and has been accepted to the exclusion of other extremely possible modes of transmission.

"The Prevention of Infectious Diseases" is a book of great practical value to the health and quarantine officer, and of interest to the medical profession at large.

L. D. M.

Dyspepsia, Varieties and Treatment. By M. Solton Fenwick, M. D. Published by W. B. Saunders Co., Philadelphia. 1910.

Any book which is the "outcome of the experience gained by the personal examination and treatment of more than 18,000 patients" deserves looking into, especially when the subject is one of great interest to every physician.

The preface begins well by pointing out that there is an almost universal disposition to regard indigestion as gastric in origin when in a large proportion of cases, the intestines and other organs are at fault; also that the gastro-intestinal tract is too closely interrelated physiologically to allow of a disturbance in only one short section. He warns us against the common mistake of considering gastrectasis and gastrophtosis as isolated princi-

mary conditions, and in various ways shows the necessity of studying the abdominal organs as a whole.

Unfortunately, the book itself abounds in inconsistencies which appear to be the result of an attempt to fit the author's ripe experience into a scheme which he says he drew up over sixteen years ago. For example, although he says it is extremely doubtful whether persistent hyperacidity ever exists independently of hypersecretion, and that he believes the latter to be due always to organic disease, yet he writes two separate articles in which there are schemes for differentiating the two. Again, at the end of a long discourse on the treatment of hypersecretion he says he cannot recall one out of 1000 cases who has recovered without operation, yet in the treatment of hyperacidity, operations are not mentioned. It is also surprising that a book which can devote twenty-eight pages to the discussion of dyspepsia due to the presence of animals in the stomach should make but cursory reference to ulcer and carcinoma.

The advocates of early diagnosis of cancer will be startled to hear that "The coexistence of enlargement of the liver, nodules in the skin of the abdomen or fluid in the peritoneal or pleural cavities all bespeak the probability of a malignant growth."

If his descriptions of "Myasthenia gastrica," "Gastric hyperesthesia," "Gastric neurasthenia" and gastrophtosis could only be worked into one picture, as he frequently hints that they should be, he could dispense with the forced differential diagnoses and needless repetitions on treatment, and instead of more confusion, a great light could be thrown upon these common conditions. He recognizes in all of them the same etiology, the same heredity, the effect of wasting diseases, rapid reduction and fatigue; he notes the association with mucous colitis and general enterophtosis, and states that the large intestine always shares in the asthenic condition of the stomach.

Although the importance of intestinal indigestion is spoken of in the preface, it receives very inadequate discussion and the examination of stools is not sufficiently encouraged. In fact all the laboratory aids to diagnosis, such as the occult blood test, etc., are slighted, and the X-Ray is hardly mentioned.

The sections on treatment are generally very good and sane though the dietetic instructions might be a little more detailed.

If the author would only break away from his needless classification and rewrite his book from the standpoint of his preface, his wide knowledge of the subject, keen observation and able therapeutics would make a remarkably good monograph a third the size of the present volume. As it is, it will amply repay those who would seek out the author's experience on various points and his methods of treatment.

W. C. A.

Diseases of the Skin. By Henry W. Stelwagon, M. D., Ph. D. Sixth Edition, revised. Published by W. B. Saunders Co., Philadelphia and London, 1910.

This book is deservedly considered one of the best text books on dermatology and in its new (sixth) edition is brought well up to date. Due consideration is given various subjects that have been prominent recently, as for example, pellagra, sporotrichosis, grain-mite, dermatitis, brown-tail moth dermatitis, various tropical skin diseases, granuloma annulare, lichen nitidus, etc. The book is very well illustrated and many new plates of special value have been added. The etiology and pathology of the various dermatoses are briefly but clearly described and special attention is paid to diagnosis and treatment. This latter feature is of particular value to the practitioner.

H. E. A.

The Care and Training of Children. By Le Grand Kerr, M. D. Funk and Wagnalls Co., N. Y. 1910.

The subjects treated in this small volume range from the regulating of a child's diet, bowels, bathing and sleep to his moral training and education, and concludes with a chapter on evil habits and the sex problem.

It is essentially a parents' book and while containing many useful suggestions, all physicians would not agree with some of Dr. Kerr's ideas, as for example, considering the morning cup of coffee harmless for children arriving at the school age.

The author makes no pretense at originality and has not added anything of value to the more able works already written along these lines.

E. H. W.

Case Histories in Pediatrics. By John Lovett Morse, M. D.; published by W. M. Leonard, Boston. 1911.

Although this volume is small it contains a large amount of information; and gives the most recent views on the topics presented. It particularly explains the means of diagnosis and of differential diagnosis; not simply the methods employed in collecting data, but especially the sifting process by which the data have always to be analyzed and weighed. In treatment likewise the book gives many helpful points, not only as to what to do but also as to what not to do. There can be no doubt of the value of the case method in teaching, for it is the method of every-day work. The histories are given of actual cases met in practice; in each case the physical findings are described; the possibilities as to diagnosis are discussed; it is shown how an accurate conclusion is to be reached in every similar case; also what is to be done and what results may rightly be expected from proper treatment. The book is really as advertised, a post-graduate course in pediatrics; and written by a man of large experience, it affords every physician an opportunity to become acquainted with the most up-to-date views about disease in children, without traveling to Boston to learn them. The one criticism to be made is that the entire field of pediatrics is not covered; but this could not be expected in the presentation of 100 case histories. No doubt Dr. Morse will ultimately write a supplementary volume; and in the meantime no one will waste dollars or time who buys and studies the present volume.

W. F. C.

Golden Rules of Diagnosis and Treatment of Diseases. Henry A. Cables, B. S., M. D. Published by C. V. Mosby Co., St. Louis, 1911.

This volume seems to occupy a place midway between a quiz compend and an abridged text book, and it is therefore difficult to determine whether it would be a boon to the "busy practitioner" or a guide to the student. What information it contains covering the diseases of the abdominal and thoracic viscera, blood ductless glands, vascular system, and injections and constitutional diseases, is fairly accurate and embodies most of the salient features of those disorders. Naturally in so small a volume (8 vo. 300 pages) the presentation of the signs and symptoms is confined to a mere enumeration. The treatments recommended, as the author announces, are compiled "from the literature and supplemented by the author's experience." The prescriptions are for the most part of the standard type and present nothing of striking novelty except that one might object to the author's recommendation of mercury in the treatment of pulmonary tuberculosis and to his advice against the employment of tuberculin. If this review conveys no decided expression of approval or the reverse, of this book, it will have been successful in reproducing the impression made on the mind of the reviewer.

G. H. T.

Bismuth Paste in Chronic Suppurations. Emil G. Beck, M. D. Published by C. V. Mosby, St. Louis, 1910.

A book devoted to the use of Bismuth Paste to fill cavities, stop discharges and close sinuses. Dr. Beck has to a large extent given up the idea earlier advanced that the therapeutic value of the Bismuth Paste depended upon its radio-activity and now believes that the chemotactic property of the paste is the prime factor. Although this gives the mechanical support of the paste a secondary role, he still holds by a fine thread to its radio-activity, especially when exposed to the X-Rays. I should rather reverse the position of the first two factors and should look at the third as gently as I could. As to diagnostic evidence of the ramifications of chronic sinuses, especially tuberculous sinuses, Bismuth injected in the manner described is surely convincing and explains so that he who runs may read how operation, no matter how radical for the cure of such chronic discharges, so usually fails of its purpose and puts the surgeon who persists in the practice in rather an unfavorable light. As a therapeutic agent Dr. Beck makes out a good case for Bismuth Paste, and not alone Dr. Beck, but most surgeons have found it the greatest addition to our armamentarium in the treatment of some conditions that has been offered. In sinuses existing around bones and joints properly used in selected cases it is of inestimable value and osteo-myelitic spaces heal as kindly and as often, when filled, as those caused by tuberculosis. It is a method which should be carefully tried in proper cases. Dr. Beck advises it in all sorts of cases, from middle-ear disease to tuberculous peritonitis. In fact would fill almost any place with Bismuth and grease. I am afraid it will be overdone and get a bad reputation from misuse rather than from failure to use. We regret to see in an apparently well-gotten up book many misleading radiograms which label evident luetic lesions as tuberculosis, but as the ordinary purchaser gets it for its suggestion of treatment and not for its pathology, probably no great harm will follow such carelessness.

S. J. H.

DR. HENRY J. KREUTZMANN'S STATEMENT.

To the Editor of the State Journal:

Dear Sir:

Kindly publish in the California State Journal of Medicine the following "Correction":

In the California State Journal of Medicine for June, 1910, page 216, you have printed, "Dr. Von Hoffman's Statement." This statement refers to an article that appeared in "The Journal" April and May, 1910, in which article I accused Dr. Von Hoffman of a grave breach of medical ethics and decency committed by examining a woman not for the purpose of diagnosis and treatment, but in order to be able to go on the witness stand and give evidence against defendant; that this examination was made upon request of the woman's (plaintiff's) lawyer, who had instituted a suit for damages against me and that Dr. Von Hoffman's testimony was theoretical only.

Dr. v. H. says in his statement, "it was some time previous to the operation that the patient came to me for examination. My diagnosis was fibroid of the uterus. After this I did not see the patient . . . until she again came to my office, after suit had been instituted. I examined her. The result of my examination being the same as on the previous examination. . . . At this time her lawyer visited my office and endeavored to obtain information favorable to his client. His visits ceased when he failed to secure more than the facts."

Now when I made this grave charge against Dr.

v. H. I did not act on "misinformation," as Dr. Von Hoffman stated; I had a substantial basis for my accusations and this basis is the sworn testimony of Dr. v. H., given on the witness stand during the trial. Through a peculiar incident, though I lost almost my whole library and all the records, etc., in the fire, the transcript of testimony of Dr. Von Hoffman, Dr. Bell and Dr. Putnam was saved. Page 34 of this transcript is found:

Direct examination of Dr. Von Hoffman, called for the plaintiff, sworn.

Mr. Burt (attorney for the plaintiff). Q. Do you know Mrs. B., one of the plaintiffs here?

A. Yes, sir.

Q. Do you remember her having gone to see you some time in September, 1897, for the purpose of consulting you in regard to her trouble?

(The operation was performed in the latter part of September. Dr. Kreutzmann.)

A. I do not remember it.

Q. Do you know a lady named Mrs. M.?

A. Yes, sir.

Q. Do you remember Mrs. B. having gone to your office with Mrs. M. about that time in 1897?

A. I do not remember.

Page 36:

Q. Have you made an examination of Mrs. B. at any time that you can remember?

A. Yes, sir; after I saw you, after you came to my office and asked to send Mrs. B. to me, I examined her again, at my office.

Q. Was that after you stated that you could not remember her first visit?

A. Yes, sir.

Cross-examination of Dr. Charles Von Hoffman. Page 37:

Mr. Loewy (defendant's attorney). Q. At what time do you remember that you examined Mrs. B.?

A. I do not remember the date. It was after her lawyer came to me.

This sworn testimony is a direct contradiction of his entire statement. In his statement Dr. v. H. knows that the woman came to him prior to the operation; he remembered that in 1910. But he swore on the witness stand that he does not remember of such a visit. In his statement Dr. v. H. avers, that the plaintiff's lawyer came to him after he, Dr. v. H., had made two examinations of Mrs. B. In his testimony he states twice, that he examined Mrs. B. only after her lawyer came to him.

Only one of the two utterances of Dr. Von Hoffman can be true, either the statement or the sworn testimony. I will not believe that Dr. Von Hoffman perjured himself. I will take the charitable view, that Dr. Von Hoffman told the truth as he swore he would do; that his statement in the "Journal" is a feeble attempt to set himself right before his colleagues.

Furthermore Dr. v. H. did not testify about the facts in the case at the time of the operation or prior thereto, for the simple reason that he denied any knowledge of the case at that time. Plaintiff's lawyer wanted theoretical testimony to the effect that it was easy to make a diagnosis of a fibroid tumor, such as found on Mrs. B. and that a physician employing ordinary care and skill should have made the diagnosis as Dr. Von Hoffman did.

Dr. v. H. examined the woman half a year after the operation; then the question of an ovarian tumor and of pregnancy had been settled; a mere tyro could then have made the diagnosis, but Dr. v. H. does not hesitate to answer the question:

Q. Was there any difficulty then in distinguishing between the nature of the trouble and an ovarian tumor?

A. No, sir.

Q. Could any physician exercising ordinary care and skill in the profession, distinguish between the two?

A. I think he would have found the same as I found, that it was an enlargement of the uterus.

(This last question was given after some talk about "ordinary care and skill." Some of the answers of Dr. v. H. were as follows):

A. I do not think there would be much difficulty.

A. I do not think it would be very difficult to distinguish between an enlargement of the uterus and an ovarian tumor.

And so merrily on!

To anyone who has any knowledge of the ways, in which "expert testimony" is secured, it is clear, that a lawyer will not risk to put a witness on the stand, before he has gone over the subject with the would-be expert, a sort of rehearsal goes on; plaintiffs' shrewd lawyer did not waste his visits (note plural in Dr. v. H.'s statement) to ask about facts; he made sure that Dr. Von Hoffman was willing to answer the theoretical questions in such a way as he needed them.

When a person sues for damages for an injury received in an accident, it is well within the lines of medical ethics, that a physician should examine such a person upon request of a lawyer in order to get evidence and to be enabled to go on the witness stand.

But, when a physician is sued for damages for alleged malpractice (most of which are instituted from hate, spite, malevolence or for blackmailing purposes) the case is entirely different. No one physician on earth is exempt from errors of judgment in diagnosing and treating patients; it is the duty of every practitioner to keep this well in mind constantly; it is the duty of an ethical physician to do his utmost to prevent a malpractice-suit against a fellow practitioner. It is one of the most contemptible, most sordid breaches of medical ethics to encourage, to aid and to assist a suit for alleged malpractice against a colleague.

It had been my intention to make formal charges against Dr. Von Hoffman before the Committee on Ethics of the San Francisco County Medical Society. As the case was not decided by the Supreme Court for years, I forgot about that. I would not have written this "Correction" but for the fact, that Dr. Von Hoffman's name appeared, some time ago, as one to open a discussion of a paper, read before the San Francisco County Medical Society.

I do not know the exact procedure in such a case, but I consider it a distinction, an honor to be called upon to open a discussion. The San Francisco County Medical Society stands for professional decency; no body of decent medical men can afford to show any distinction at its disposal to any one who is guilty of gross breach of medical ethics.

Heretofore, in my paper, "History of a Lawsuit," I have merely made a statement of the case; Dr. Von Hoffman has made a statement; one man's word is as good as another's. But now through the sworn testimony of Dr. v. H., I have shown that his statement is a fabrication from beginning to end, that Dr. Von Hoffman stands convicted, through his own testimony, of the grave charges I made against him. I bring these facts to the cognizance of the officers and members of the San Francisco County Medical Society. As far as I am concerned Dr. Von Hoffman may continue to be a member of this organization; but I do protest against any further distinction or honor being shown Dr. v. H. Any such act would be an insult to every decent member of the San Francisco County Medical Society; it would put the San Francisco County Medical Society on a very low standing and would render the Committee on Medical Ethics a ridiculous farce.

Sincerely yours,

DR. HENRY J. KREUTZMANN.

ARMY MEDICAL CORPS EXAMINATIONS.

The Surgeon-General of the Army announces that preliminary examinations for appointment of first lieutenants in the Army Medical Corps will be held

on July 10, 1911, and September 5, 1911, at points to be hereafter designated.

Full information concerning these examinations can be procured upon application to the "Surgeon-General, U. S. Army, Washington, D. C." The essential requirements to securing an invitation are that the applicant shall be a citizen of the United States, shall be between 22 and 30 years of age, a graduate of a medical school legally authorized to confer the degree of doctor of medicine, shall be of good moral character and habits, and shall have had at least one year's hospital training, after graduation. The examinations will be held concurrently throughout the country at points where boards can be convened. Due consideration will be given to localities from which applications are received, in order to lessen the traveling expenses of applicants as much as possible.

The examination in subjects of general education (mathematics, geography, history, general literature, and Latin) may be omitted in the case of applicants holding diplomas from reputable literary or scientific colleges, normal schools or high schools, or graduates of medical schools which require an entrance examination satisfactory to the faculty of the Army Medical School.

In order to perfect all necessary arrangements for the examination, applications must be complete and in possession of the Adjutant-General at least three weeks before the date of examination. Early attention is therefore enjoined upon all intending applicants. There are at present sixty-one vacancies in the Medical Corps of the Army.

THE LANE MEDICAL LECTURES FOR 1911.

The Lane Medical Lectures were founded in 1896 by Dr. Levi Cooper Lane, then President of Cooper Medical College. They consist of a "free course of lectures on medical subjects by men distinguished at home or abroad for their work in either medicine or surgery, and are intended for medical students and the medical profession at large."

The Directors of Cooper Medical College have invited Dr. Ernest Fuchs, Professor of Ophthalmology at the University of Vienna, for the course of 1911. The course will consist of ten lectures and demonstrations to be given in Lane Hall of Cooper Medical College during the week beginning August 21st. The program is as follows:

August 21st—11 a. m. Operations on the Eye.
4:30 p. m. The Eye in Tabes.

August 22nd—11 a. m. Trachoma.
4:30 p. m. The Eye in Tabes.

August 23rd—11 a. m. Tumors of the Eye.
4:30 p. m. The Eye in Brain Affections.

August 24th—11 a. m. General Symptomatology.
4:30 p. m. The Eye in Brain Affections.

August 25th—11 a. m. Corneal Ulcers.
4:30 p. m. The anatomical and functional development of the eye from its lowest to its highest type, through the animal kingdom.

All of these lectures are intended for the general practitioner as well as the specialist. The lectures will be delivered in English in Lane Hall, San Francisco, and will be fully illustrated. Members of the medical profession, including students of medicine, are cordially invited to attend.

The previous courses of Lane Medical Lectures have been given as follows:

Sir William MacEwen, M. D., Regius Professor, University of Glasgow.—"Surgery of the Brain."

Christopher Heath, F. R. C. S., England, Professor of Clinical Surgery, University College, London.—"Congenital Malformations, Aneurism, and Other Surgical Topics."

Thomas Clifford Allbutt, M. D., F. R. S., Regius Professor of Physic, University of Cambridge, England.—"Diseases of the Heart."

Nicholas Senn, M. D., Ph. L. L. D., Professor of Surgery, Rush Medical College.—"Topics in General Surgery."

Sir Michel Foster, K. C. V., D. C. L., Professor of Physiology, Cambridge, England.—"History of Physiology."

Sir Malcolm Morris, F. R. C. S., Edinburg, M. R. C. S., England, Surgeon to the Skin Department, St. Mary's Hospital, London.—"Social Aspects of Dermatology."

Sir Charles B. Ball, M. Ch., F. R. C. S., Ireland, Regius Professor of Surgery, University of Dublin.—"Diseases of the Rectum."

Oscar H. Allis, M. D., Philadelphia, Pennsylvania.—"Dislocations and Fractures Involving Larger Bones."

William H. Welch, M. D., L. L. D., Professor of Pathology, Johns Hopkins University, Baltimore.—"Infection and Immunity."

Sir Patrick Manson, K. C. M. G., F. R. S., etc.—"Tropical Diseases."

John C. McVail, M. D., D. P. H., Cambridge, Glasgow.—"Practical Hygiene, Epidemics and Preventive Medicine."

Reginald Heber Fitz, M. D., L. L. D., Hersey Professor of Theory and Practice of Medicine, Harvard University, Boston, Mass.—"A Consideration of Some Features of the Lymphatic System."

Subsequent courses of Lane Medical lectures will be under the auspices of the Medical Department of Leland Stanford Jr. University.

In Error.

On page 178 of the June issue appears the name of C. Thornton, San Diego, under New Members; it should read A. J. Thornton.

NEW MEMBERS.

Gundry, F. J., Bakersfield.
Long, S. F., Bakersfield.
Stice, T. H., San Jose.
Durgin, E. H., Cupertino.
Pius, Chas., Montague.
Shaul, J. W., Santa Ana.
Sheldon, D. W., Perris.
Keck, W. H., Santa Cruz.
Graham, R. W., Los Angeles.
McNeile, L. G., Los Angeles.
Deering, W. E., Los Angeles.
Hooker, M. O., San Francisco.
Evans, Morris, San Francisco.
Topham, Ed., San Francisco.
Knapp, Edw. V., San Francisco.
Green, A. S., San Francisco.
Beasley, S. O., San Francisco.
Parsons, E. W., San Francisco.
Ragland, W. A., San Francisco.
Waiss, A. S., San Francisco.
Sperry, M. A., San Francisco.
Williamson, Wm. P., San Diego.
Riehl, W. F. W., San Diego.
Trueblood, W. E., Maricopa.
Cook, W. H., McKittrick.
Smith, S. F., Bakersfield.

DEATHS.

Caldwell, Robt., San Jose.
Bowie, Robt. I., formerly of San Francisco; died in Nagasaki, Japan.
Smith, Wm. S., Ocean Park, Cal.
Blake, S. L., San Francisco.
Bellows, C. S., Artesia.
Parker, T. Van V., Soldiers' Home (Los Angeles County).
Elster, L. A., Alameda.
Withers, Richard J., Los Angeles.
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